大正七年七月十日第三種郵便物認

THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE

上海仁記路第五號
遠東時報
A.C.TAYLER

"UP CLOSE"

A Close Up Picture of the Forces Behind the Anti-Japanese Agitation of 1919-20

SPILLING THE SIBERIAN BEANS
HAVE FAITH IN COOLIDGE
THE CAUSE OF ALL THE TROUBLE IN CHINA
IS CHINA TURNING RED?
UNIFICATION BY MEANS OF FREE TRADE
MOTIVE POWER DEVELOPMENT ON PEKING-SUIYANG RAILWAY
NEW O.S.K. MOTORSHIPS
MALAYAN COLLIERIES
BANGKOK'S TRAMWAYS
TOBACCO INDUSTRY OF KOREA
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Vol. XXI
January, 1925
No. 1

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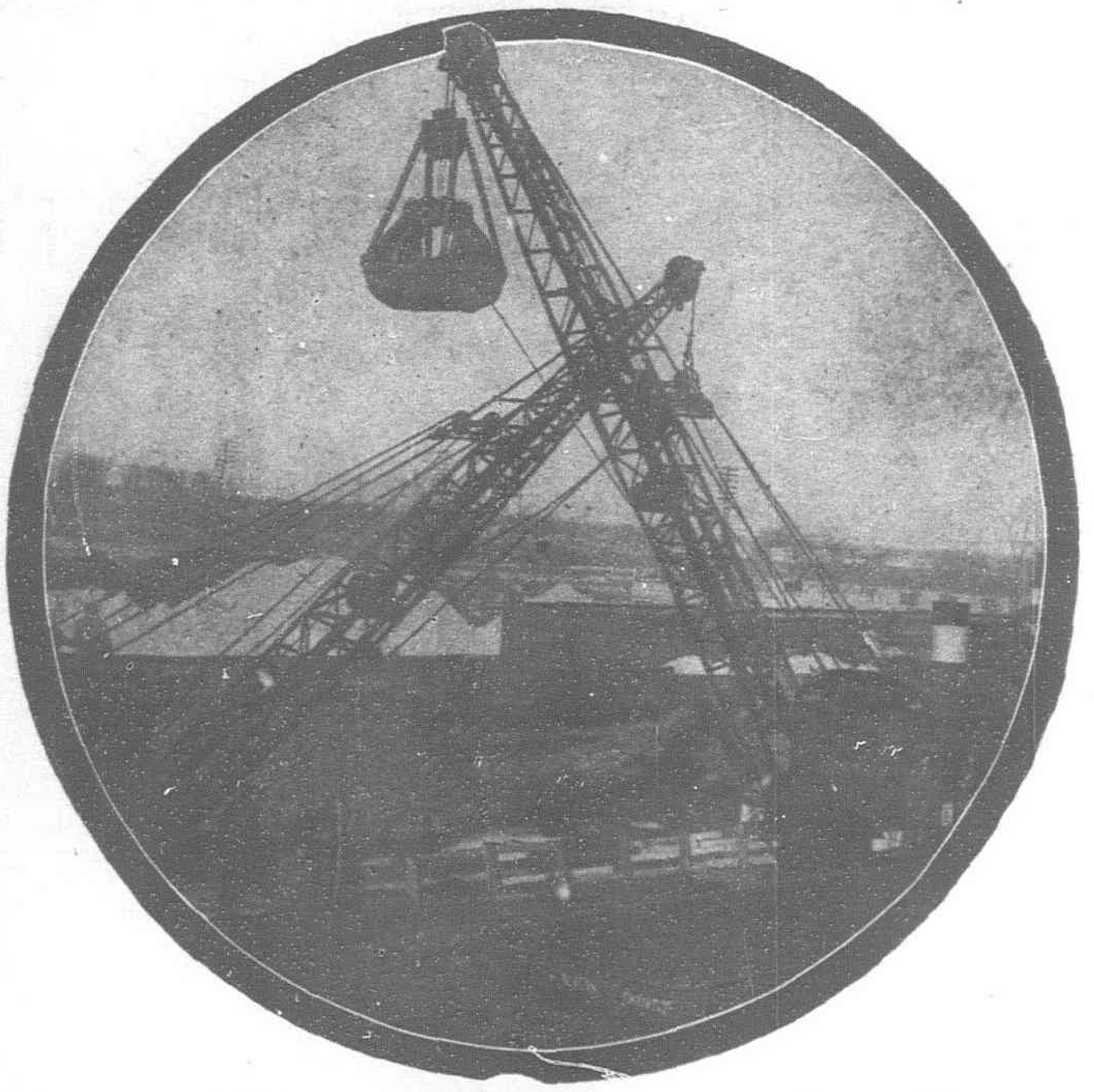

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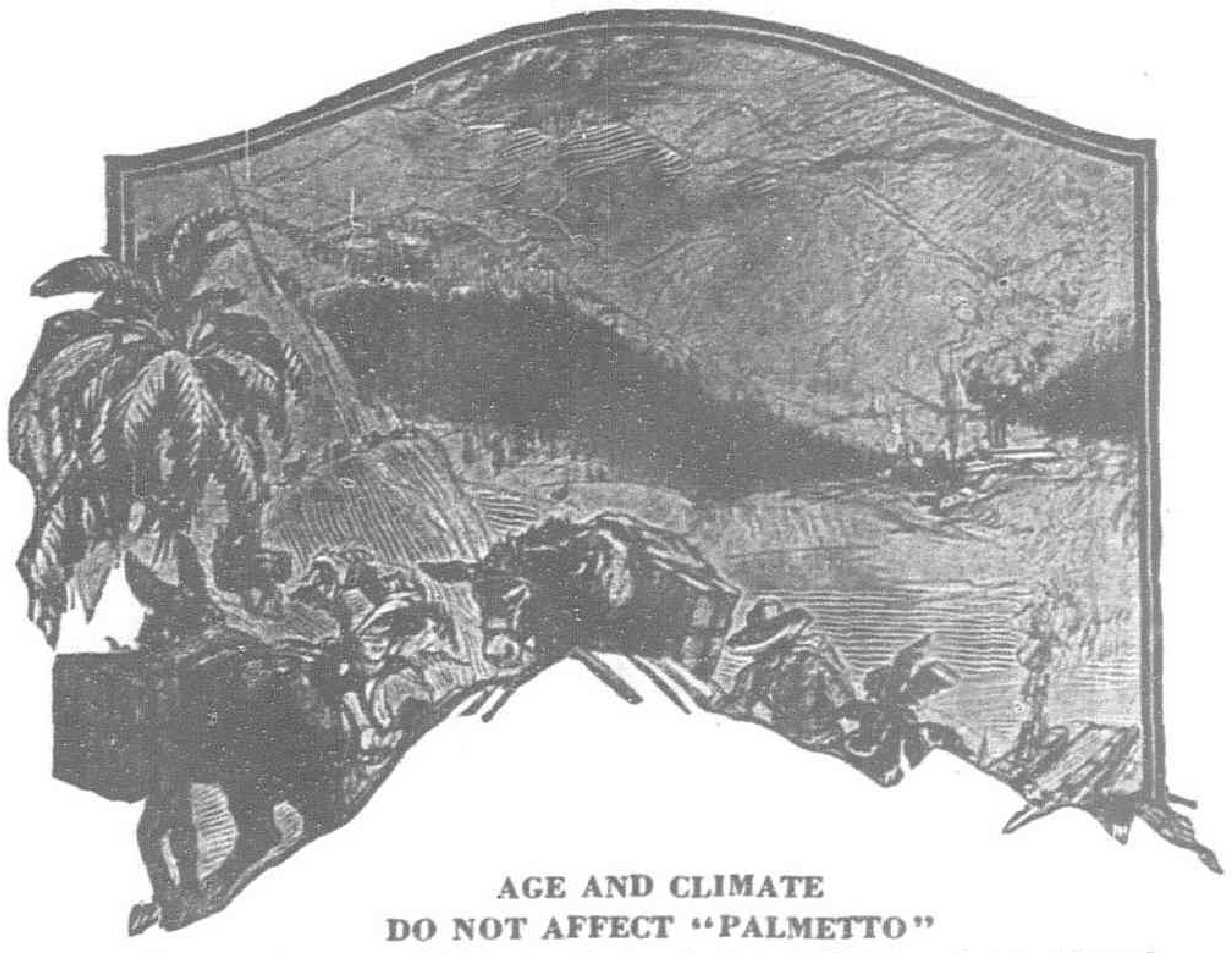

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VOL. XXI JANUARY, 1925 NO. 1

CONTENTS:

PAGE
"UP CLOSE" *1
SPILLING THE SIBERIAN BEANS 3
THE BRITISH BOXER INDEMNITY 5
A "DAWES PLAN" FOR CHINA 5
THE ROOT OF ALL THE TROUBLE *6
IS CHINA TURNING RED? 8
UNIFICATION BY MEANS OF INTERNAL FREE TRADE 9
PERFECTLY SOUND AMERICANISM 10
HAVE FAITH IN COOLIDGE! *11
INDIAN RAILWAY MAKE DRASTIC CHANGES .. 13
NEW FIREFLOAT FOR THE HONGKONG GOVERNMENT 13
GREATER OSAKA *14
TEST OF THREE-CYLINDER LOCOMOTIVE FOR THE SOUTH MANCHURIA RAILWAY *16
MOTIVE POWER DEVELOPMENT ON THE PEKING-SUIYUAN RAILWAY *20

PAGE
BRITISH CONTRACTS FOR THE FAR EAST.. .. 22
A BIG ENGINEERING PROJECT FOR FAMINE RELIEF *23
NEW HOME OF THE MORRISON LIBRARY.. .. *25
VALVES FOR IRRIGATION WORKS *26
RESTORATION OF THE WORKS OF THE NIPPON ELECTRIC COMPANY, LTD. *27
NEW MOTOR SHIPS FOR THE O. S. K *28
THE TOBACCO INDUSTRY OF CHOSEN *31
IRRIGATION AND RIVER CONTROL IN THE N.E.I. *35
DOES AGRICULTURAL IMPROVEMENT PAY? .. 40
WORTHINGTON LOCOMOTIVE FEED WATER HEATER *41
BANGKOK'S TRAMWAYS AND LIGHTING *43
GAS PRODUCER POWER PLANT WITH PHILIPPINES.. .. .. *45
MALAYAN COLLIERIES, LTD. *46

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Avery, Ltd., W. & T. 11

Babcock & Wilcox, Ltd. 31
Baldwin Locomotive Works 65
Bank of Chosen 54
Banque de l'Indo-Chine 56
Bank of Taiwan, Ltd. 61
Berger Manufacturing Co. 5
Bethlehem Steel Export Corp. 73
Bliss Co., E. W. 19
Brill Co., J. G. 39
British-American Tobacco Company (China), Ltd. 9
Browning Co., The .... Cover
Bucyrus Company 7
Buhler Brothers .... (Text) 48
Butterfield & Swire 44

Canada Carbide Co., Ltd. 70
Chambers Scott & Co., Ltd. 14
Chartered Bank of India, Australia & China 48
Columbia Ribbon & Carbon Mfg. Co. 70

Daido Electric Power Co., Ltd. 28
Dai-Ichi Ginko 62
Dai Nippon Brewery Co. 34
Diamond State Fibre Co. 15
Dixon Crucible Co., Joseph 70
Dodge Brothers 3
Drewry Car Co., Ltd. 13

Electricity Department, S. M. C. 4
Escher Wyss & Cie 16
Etchells Congdon & Muir, Ltd. 14
Evans & Sons (Wolverhampton), Ld., Joseph 2

Fairbanks Co. 35
Fairbanks Morse & Co. 34
Fuji Gassed Spinning Co. 10

Gas & Fuel Plants, Ltd. 14
General Fireproofing Co. 41
Gleniffer Motors, Ltd. 13
Goodbrand & Co., Ltd. 6
Goodell-Pratt Co. 35
Green Island Cement Co., Ltd., The .. 20
Greene, Tweed & Co. .... Cover
Greenfield Tap & Die Corp. 21

Hasler Telegraph Works 36
Heinemann, A. G., Gebr. 19
Hongkong Rope Manufacturing Co. . 20
Hongkong & Shanghai Banking Corporation 59
Hongkong & Whampoa Dock Co., Ld. 30
Horsfall & Bickham, Ltd. 13
Hotel Statler Co. 53

Imperial Japanese Government Railways 66, 67
Industrial Bank of Japan, Ltd. 58
Ingersoll-Rand Co. 75
International Banking Corporation .. 55
International General Electric Co., Inc. 51

Japan Sugar Co., Ltd. 6
Jardine Engineering Corporation, Ltd., The 12
Jones & Lamson Machine Co. 63

Jugo Ginko 56

Kanegafuchi Spinning Co., Ltd. 10
Kawasaki Dockyard Co., Ltd. 33
Kellogg Switchboard & Supply Co. Under Index
Kelvin Bottomley & Baird, Ltd. 27
Kitchen & Wade 62
Kjellberg Successors, Ltd. 74
Kokusai Kisen Kaisha 45

London Directory Co., Ltd. 61
Louisiana Planter & Sugar Manufacturer, The 62

Manning, Maxwell & Moore, Inc. 14
Mather and Platt, Ltd. 2
McConway and Torley Co. 74
Mills & Manning, Inc. 52
Mitsubishi Bank, Ltd. 57
Mitsubishi Iron & Steel Co., Ltd. 38
Mitsubishi Marine & Fire Ins. Co., Ld. 38
Mitsubishi Shoji Kaisha 18
Mitsubishi Warehouse Co. 38
Mitsubishi Zosen Kaisha, Ltd 39
Mitsui Bank, Ltd. 57
Mitsui Mining Co. 18
Mitsui Bussan Kaisha 26
Motor Rail & Tram Car Co. 5
Mustard & Co. 74

Nippon Menkwa Kabushiki Kaisha .. 50
Nippon Yusen Kaisha 46, 47
Nipponophone Co., Ltd. 63
Nobel Industries, Ltd. 22

Okura & Co. (Trading), Ltd. 24
One Hundredth Bank, Ltd., The 59
Osaka Shosen Kaisha 42

Pooley & Son, Ltd., Henry 4

Redpath Brown & Co., Ltd. 15
Reyrolle & Co., Ltd., A. 27
Ridgway Dynamo & Engine Co. 17
Royal Bank of Canada 61
Ruston & Hornsby, Ltd. 5

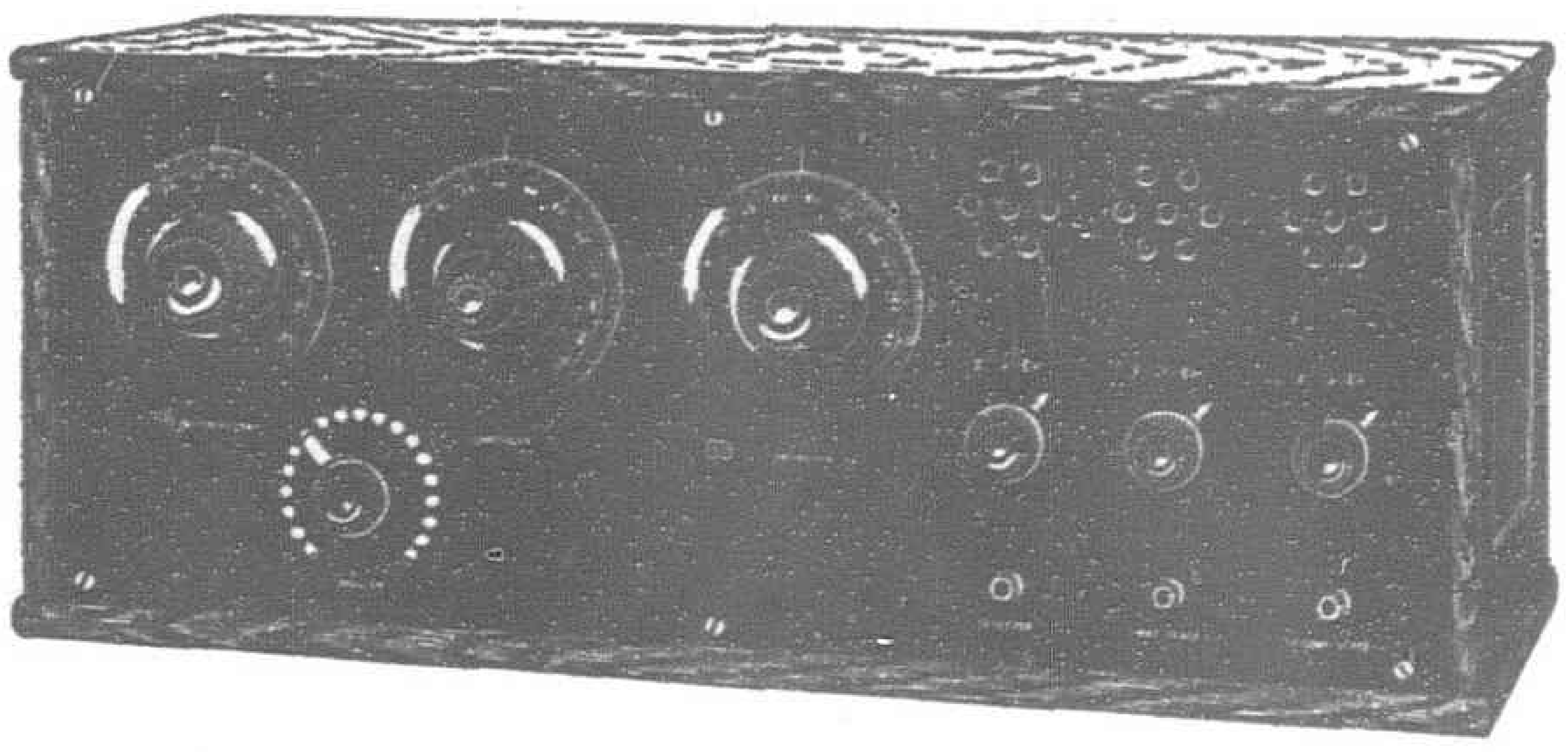
Sale & Frazar, Ltd. 8
Shanghai Dock & Eng. Co., Ltd. 32
Shanghai Municipal Council 4
Siemens China Co. 36
Smidth & Co., F. L. 72
Smooth On Mfg. Co. 15
South Manchuria Railway Co. 64, 68, 69
Standard Oil Co. of N. Y. 29
Standard Underground Cable Co... 36
Stewarts & Lloyds, Ltd. 16
Sturtevant Co., B. F. 63
Sulzer Bros. .... (Text) 48
Sumitomo Goshi-Kaisha 60
Sumitomo Bank, Ltd. 60
Superheater Co., The 27

Thornycroft & Co., Ltd., John I. 1
Toshin Soko 40
Toyo Kisen Kaisha 43
Trimont Manufacturing Co. 7

United States Steel Products Company .... 23, 37, Back Cover

Walworth International Co. 72
Westinghouse Electric International Co. 78
Williams & Co., J. H. 7
Worthington Pump & Machinery Corporation 71

Yarrow & Co., Ltd. 21
Yokohama Dock Co. Ltd. 34
Yokohama Specie Bank, Ltd. .... Cover



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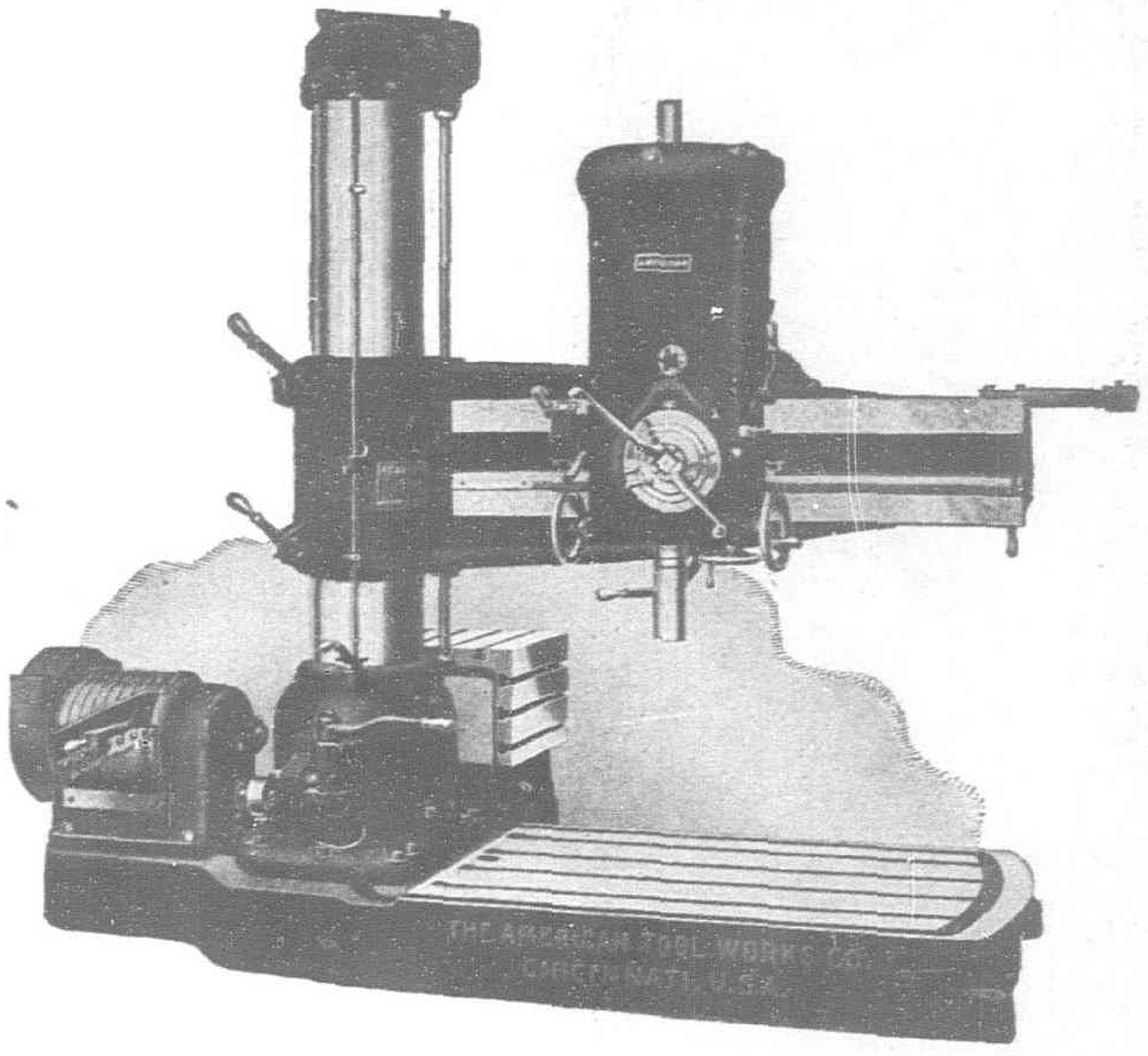

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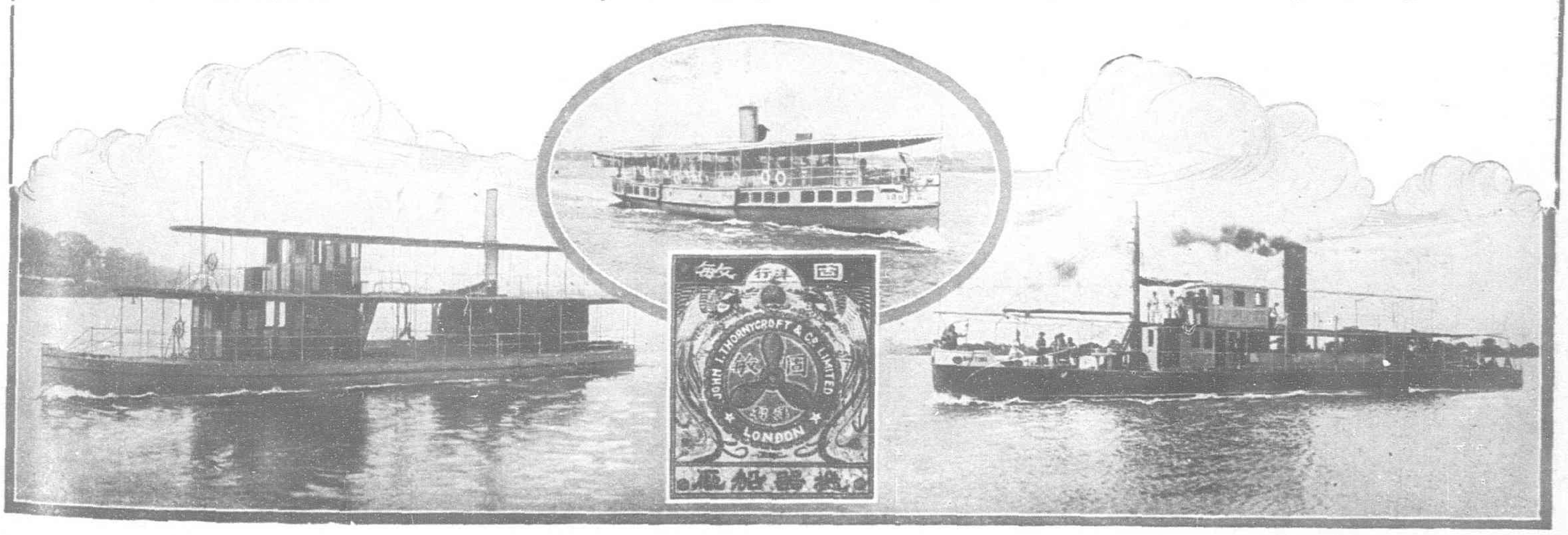

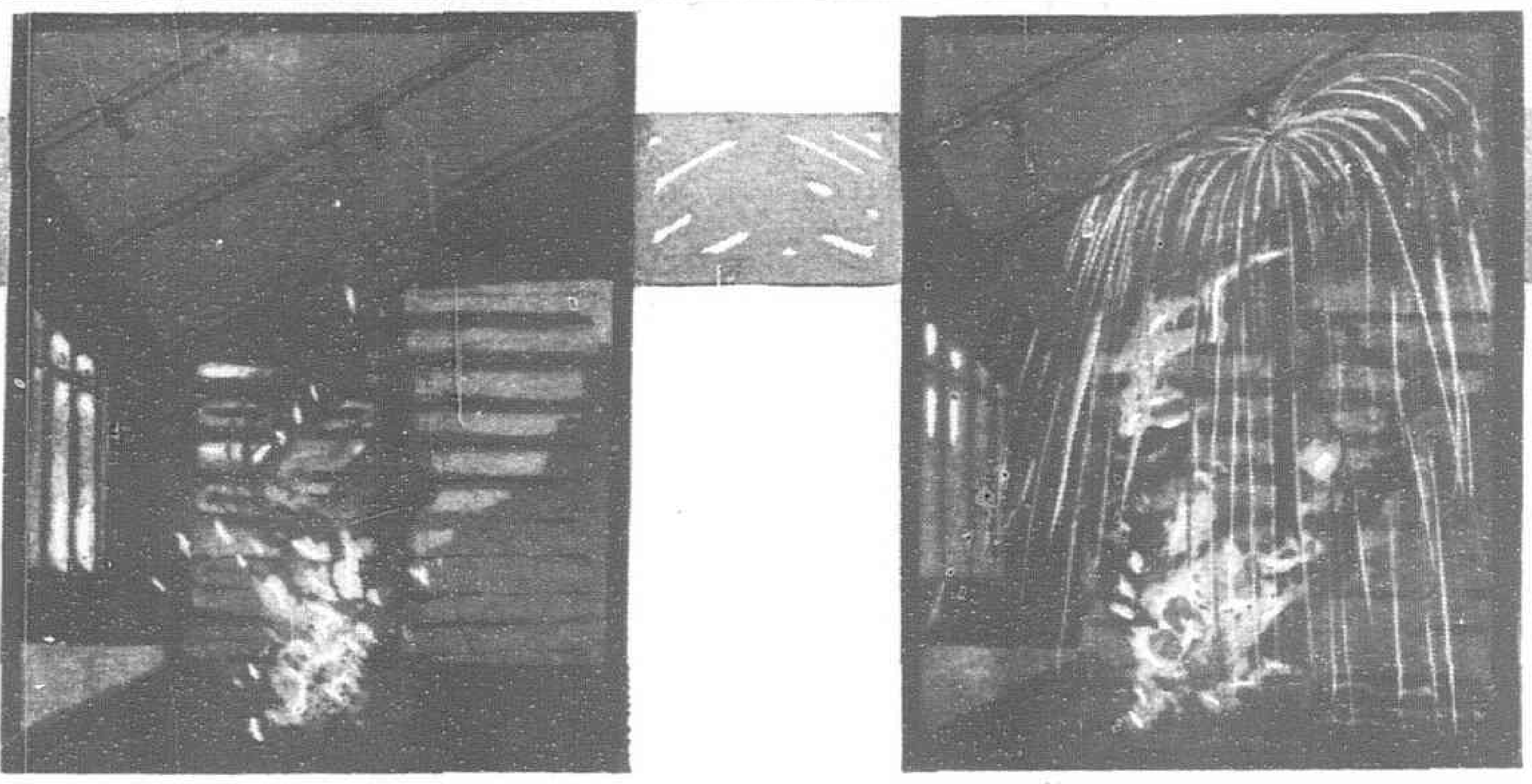

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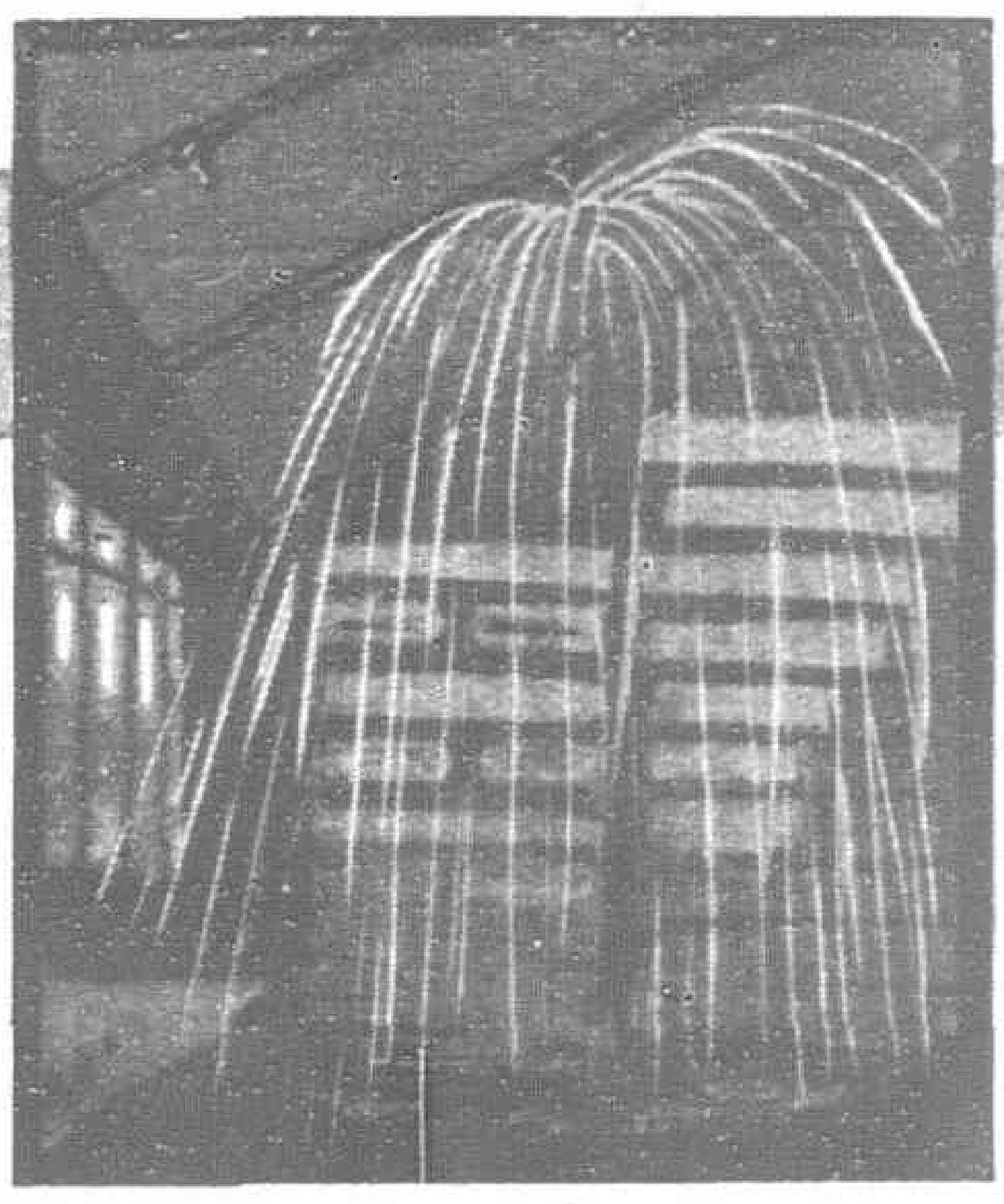
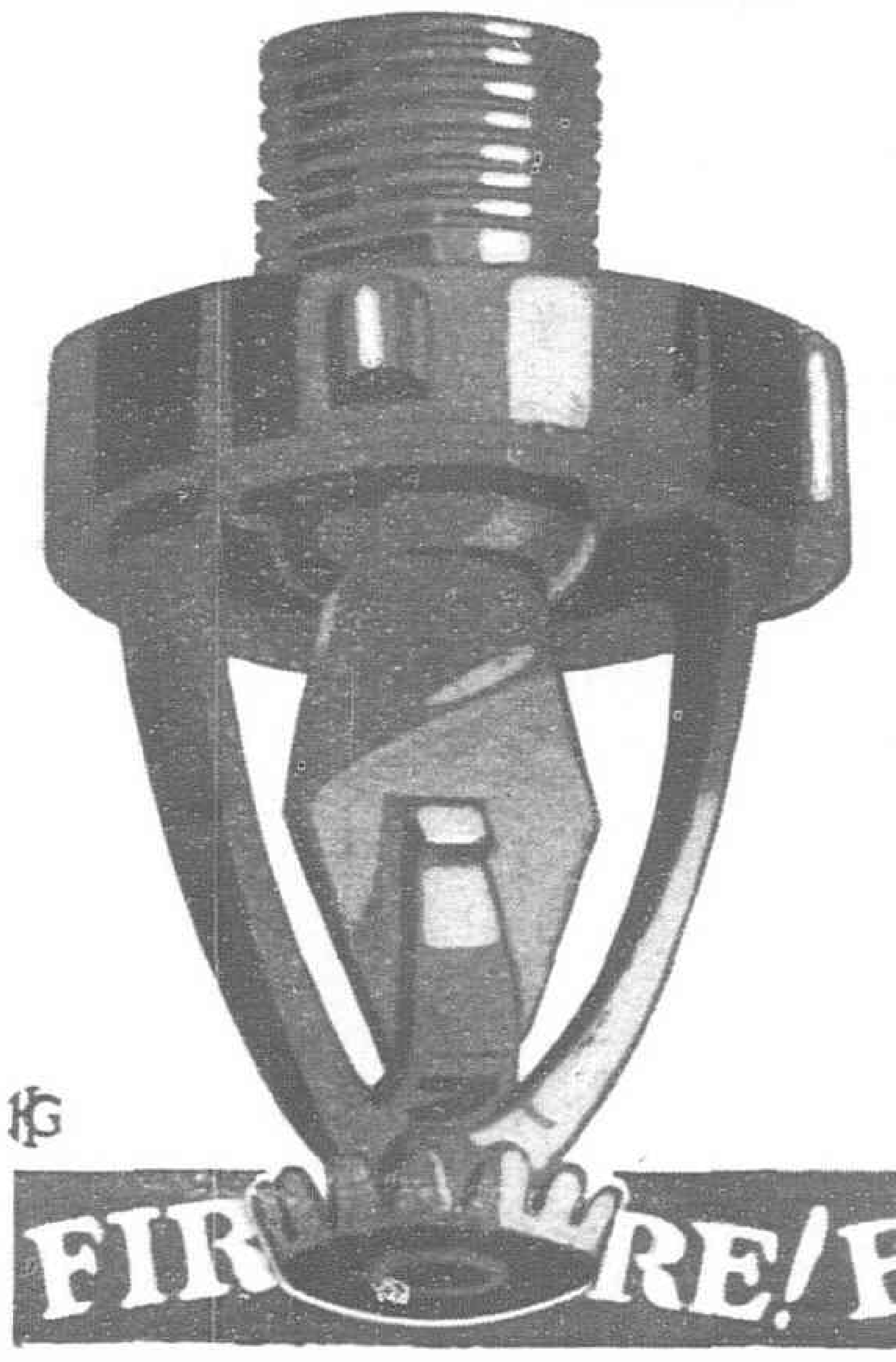


—and extinguishes the Fire!



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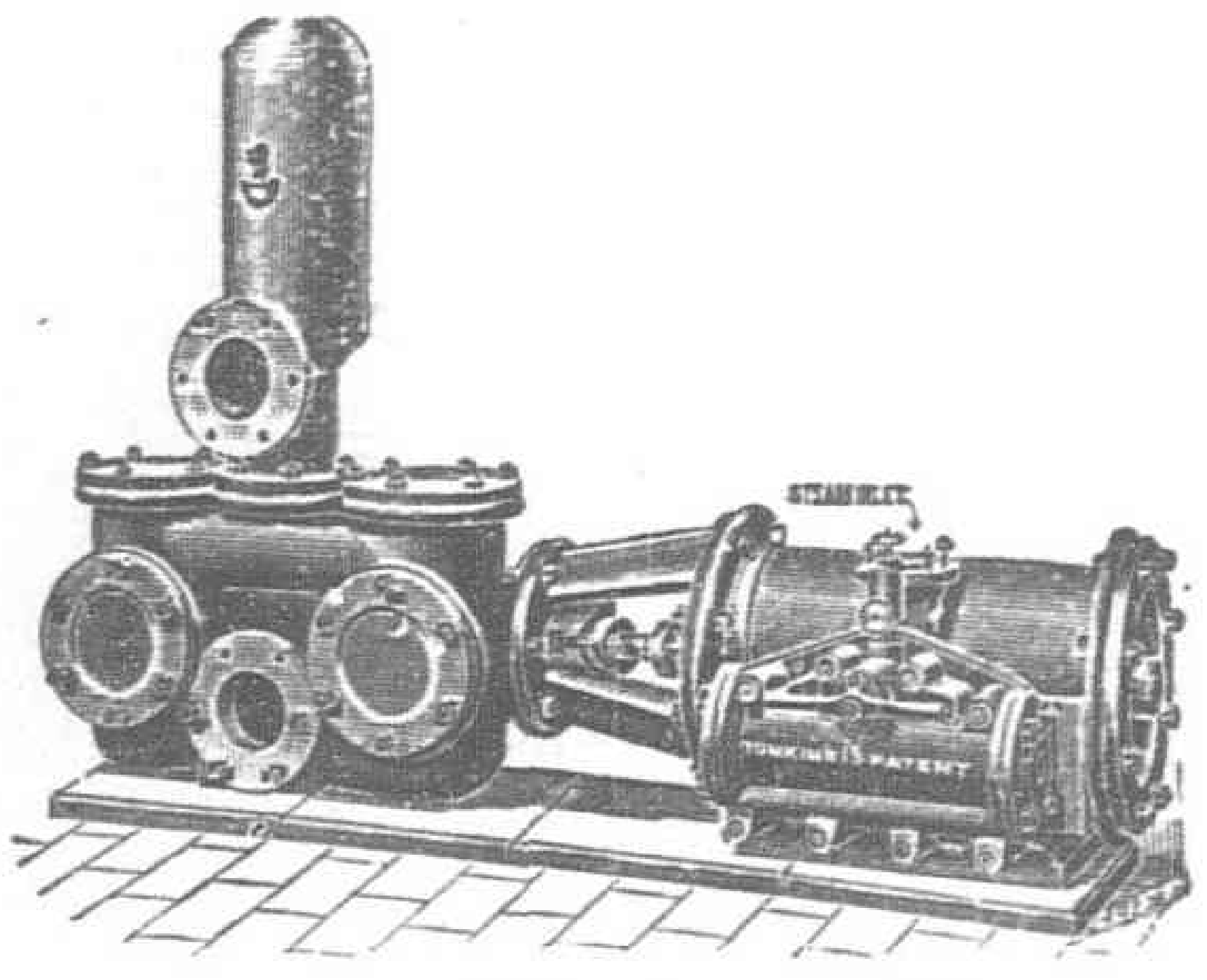

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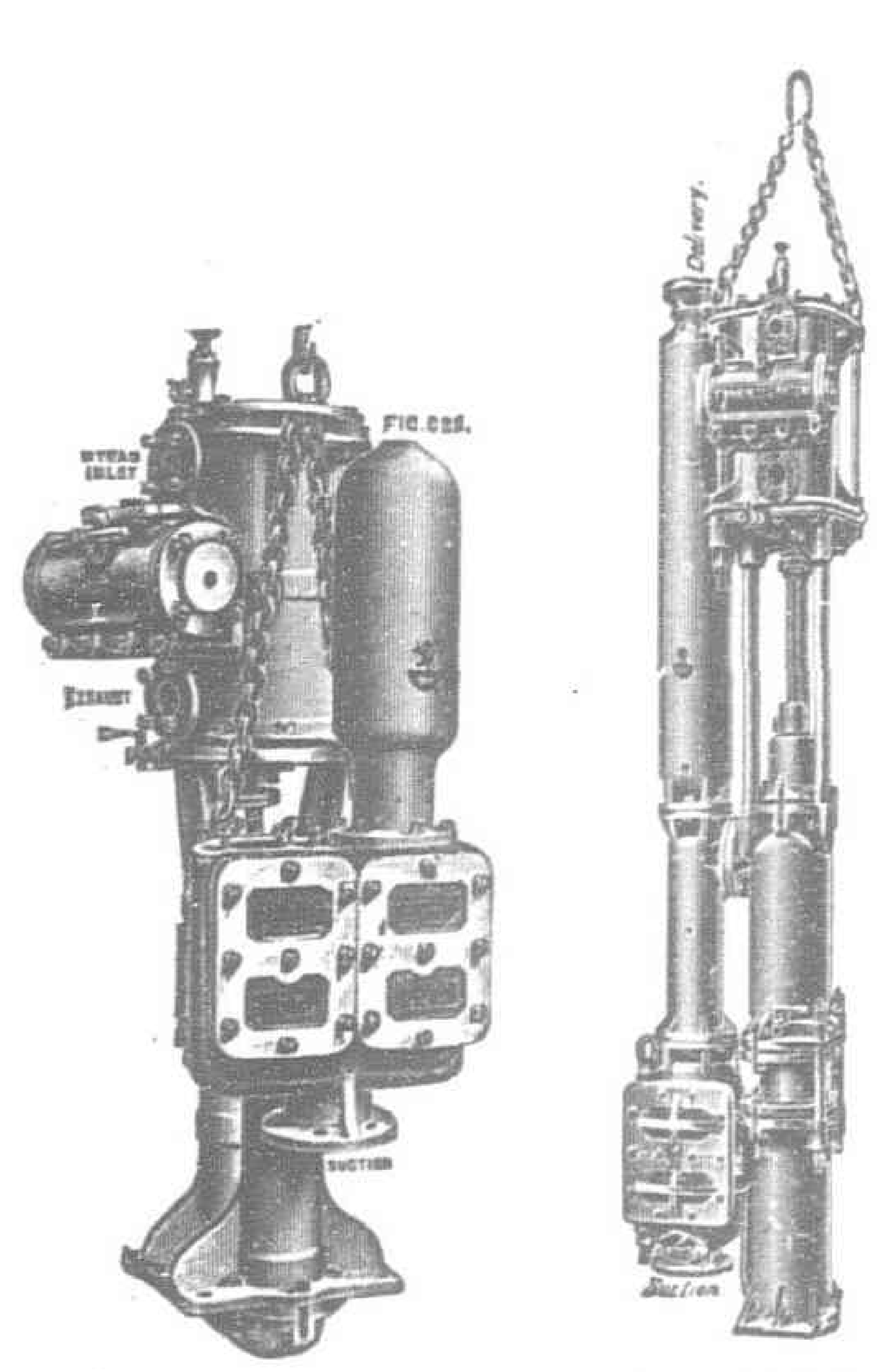

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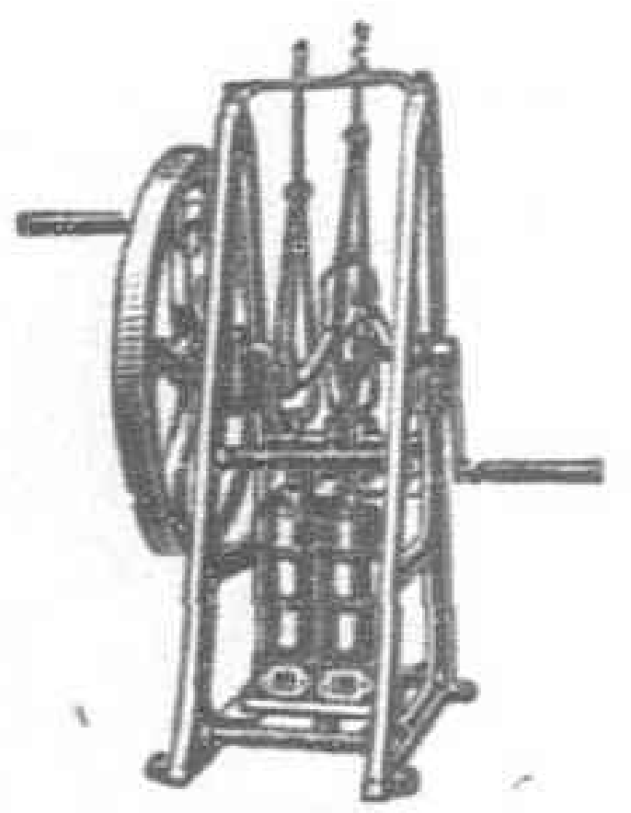
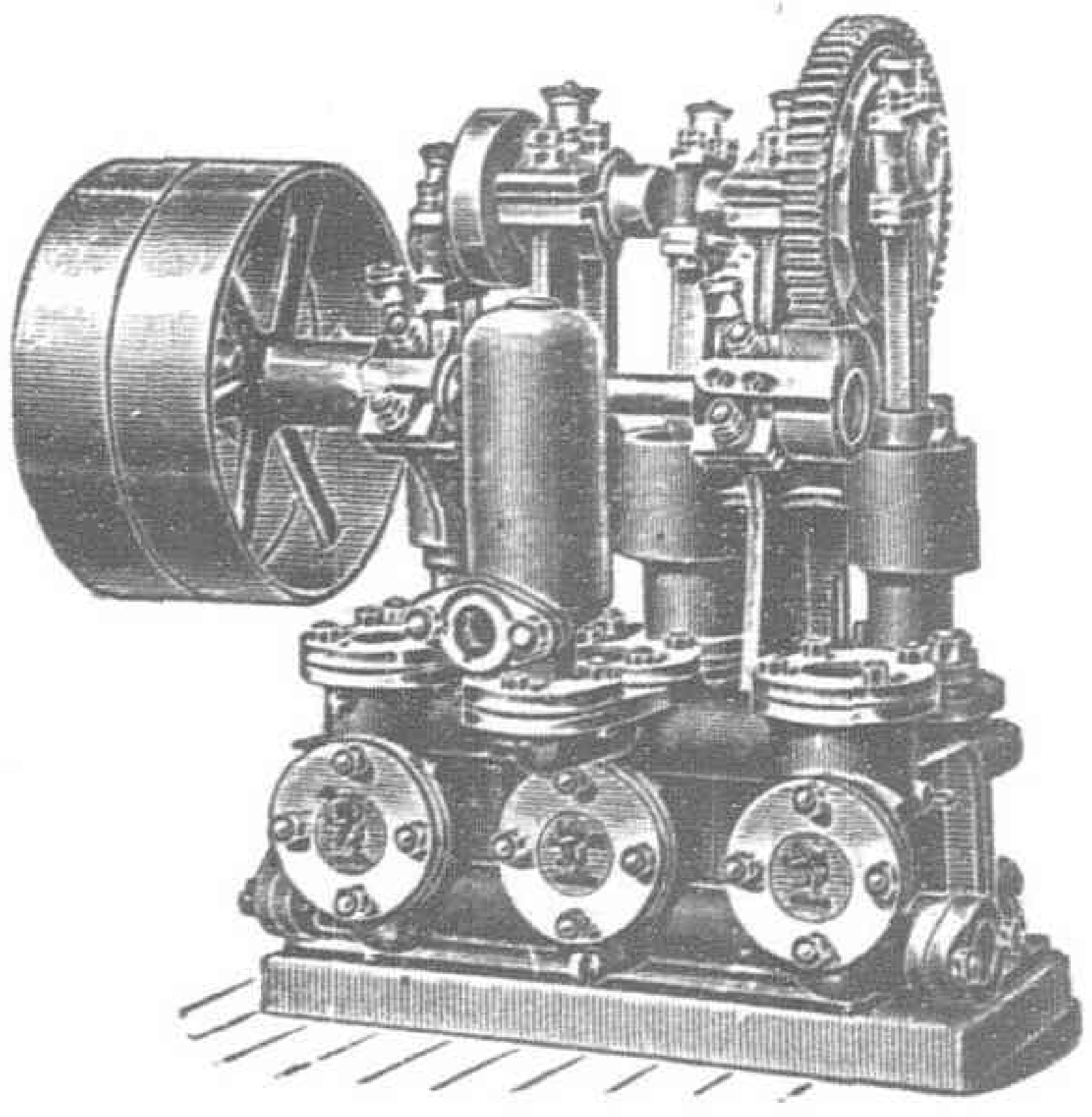


FIG.225.

FIG.160.



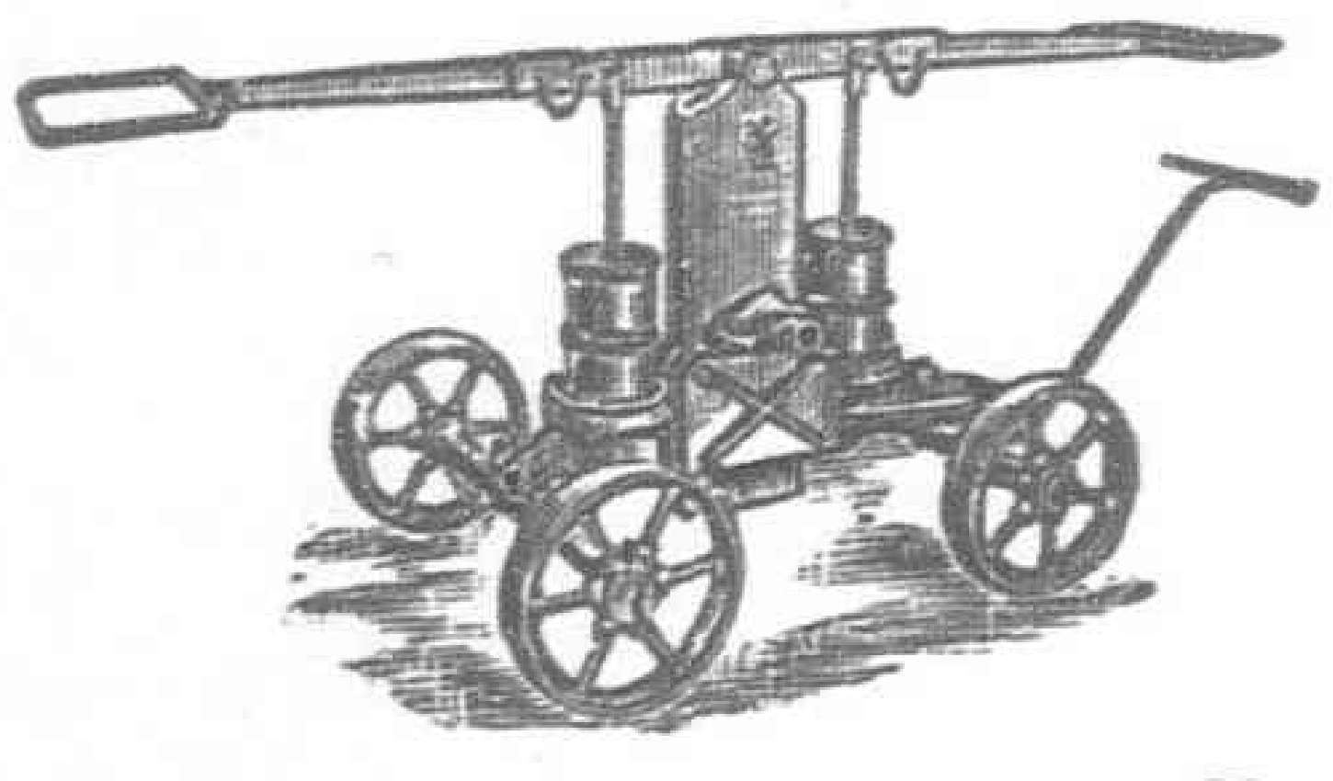
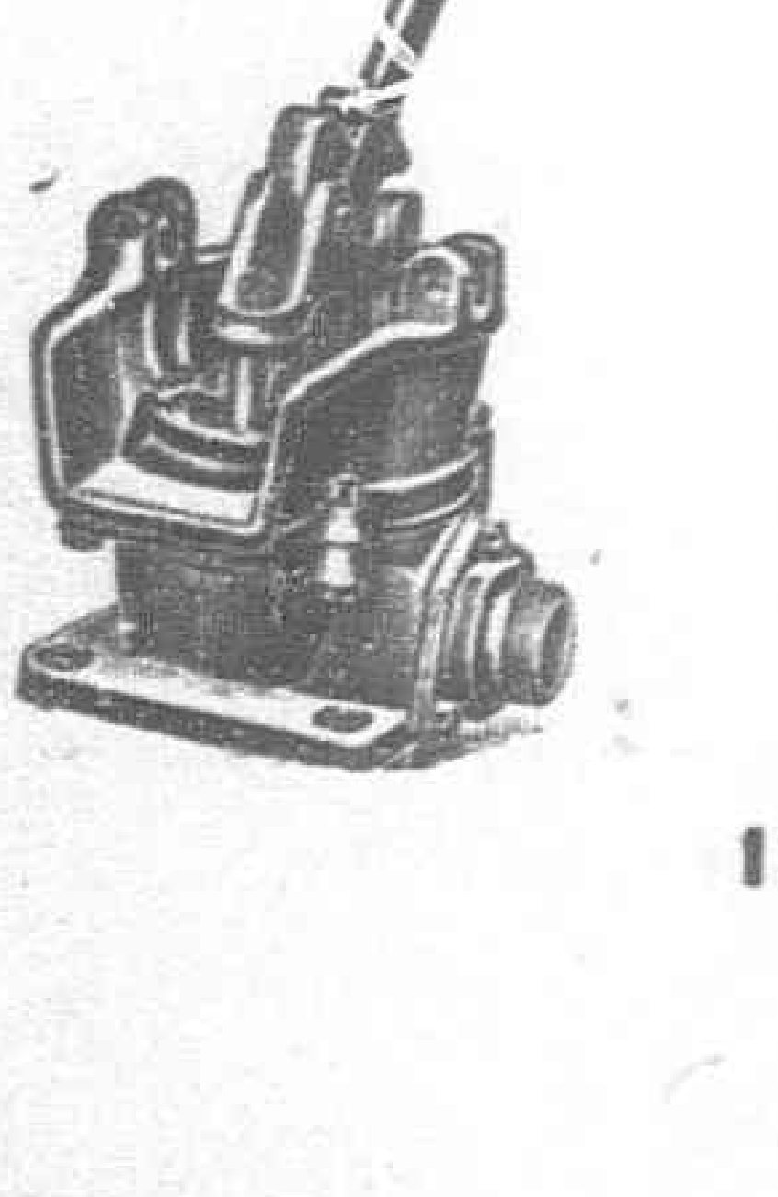


FIG.191.



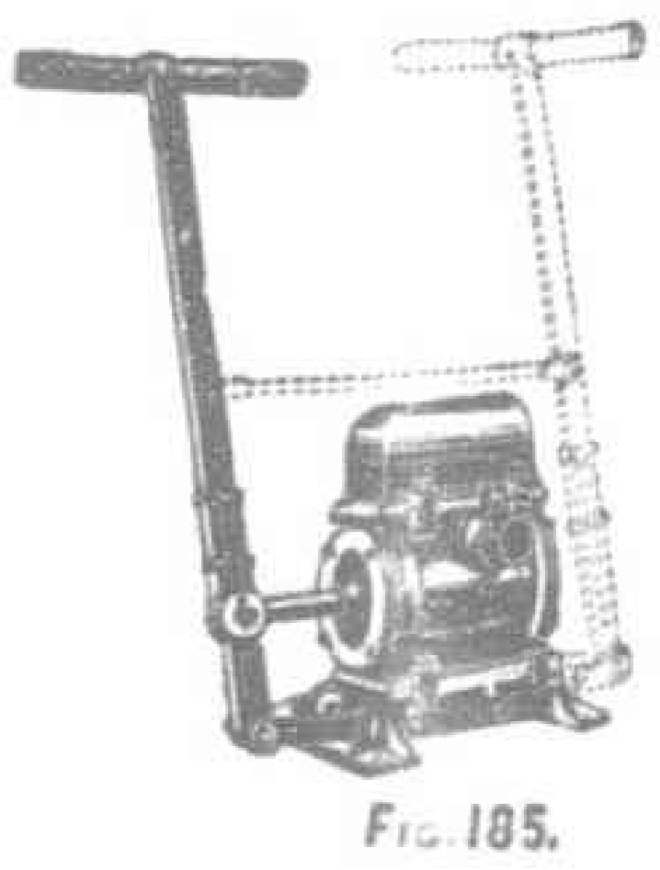


FIG.185.

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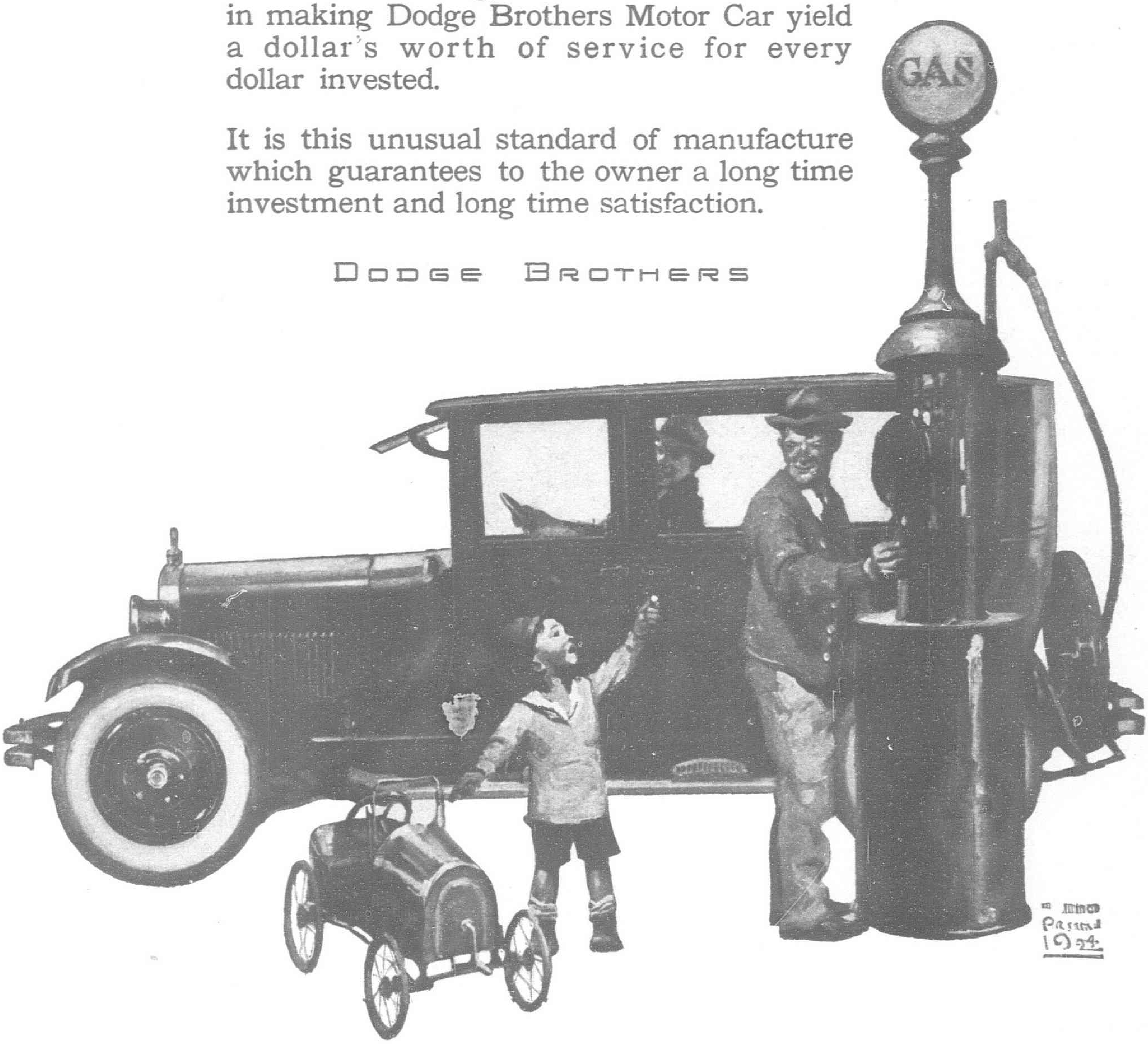

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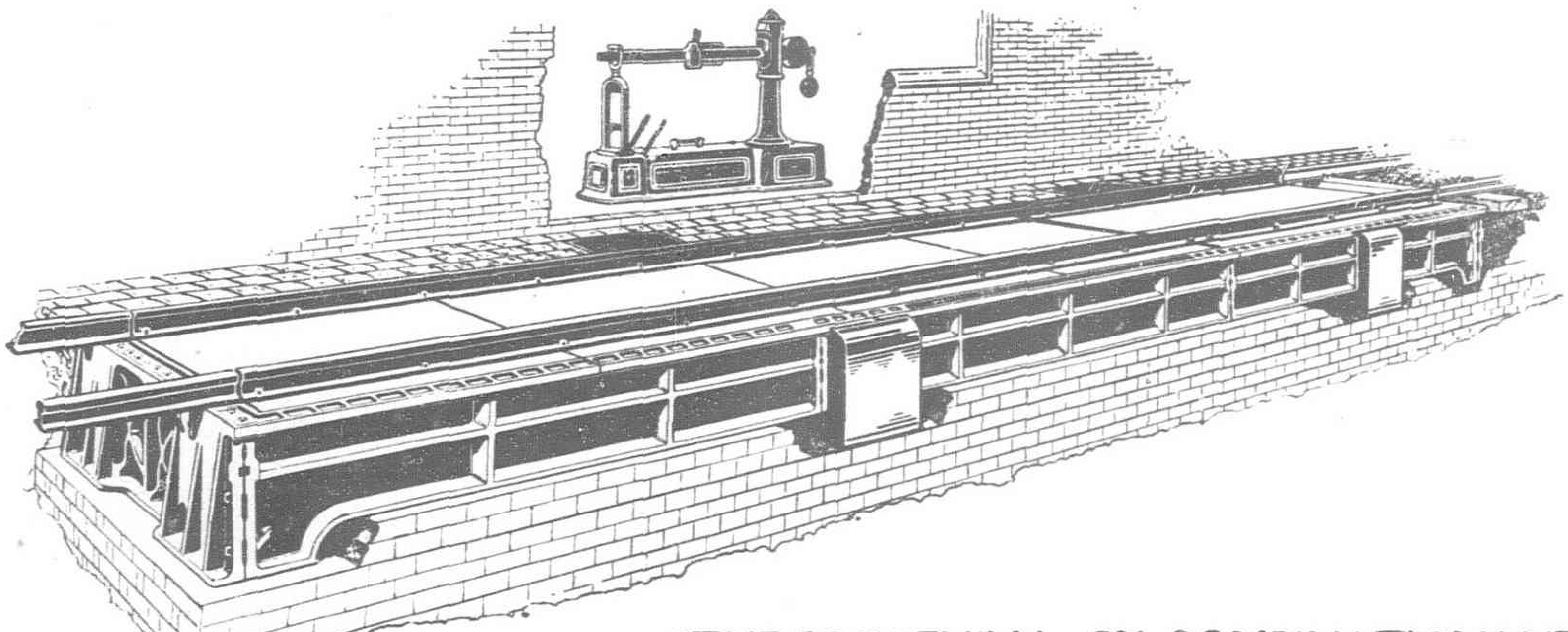

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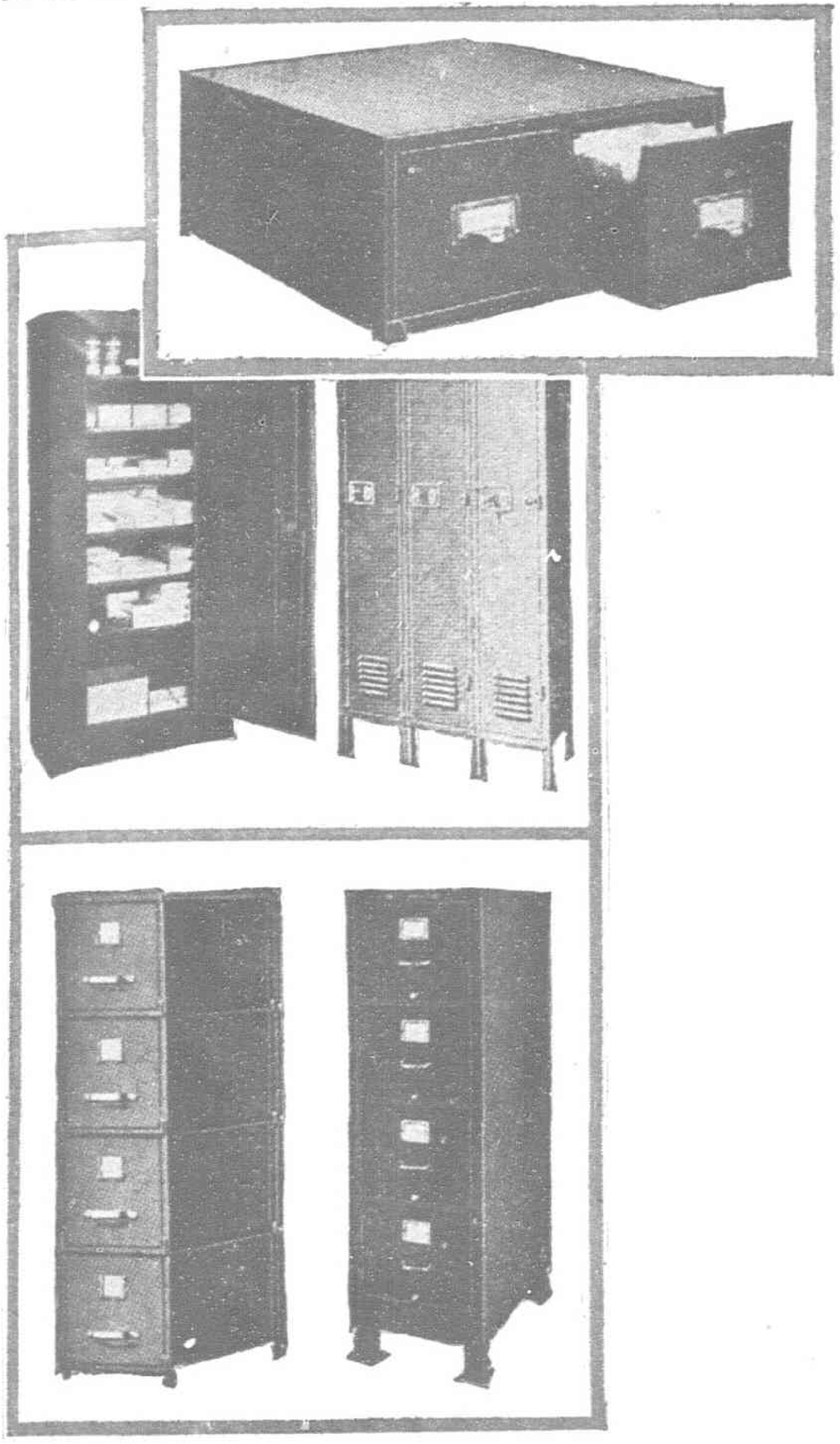

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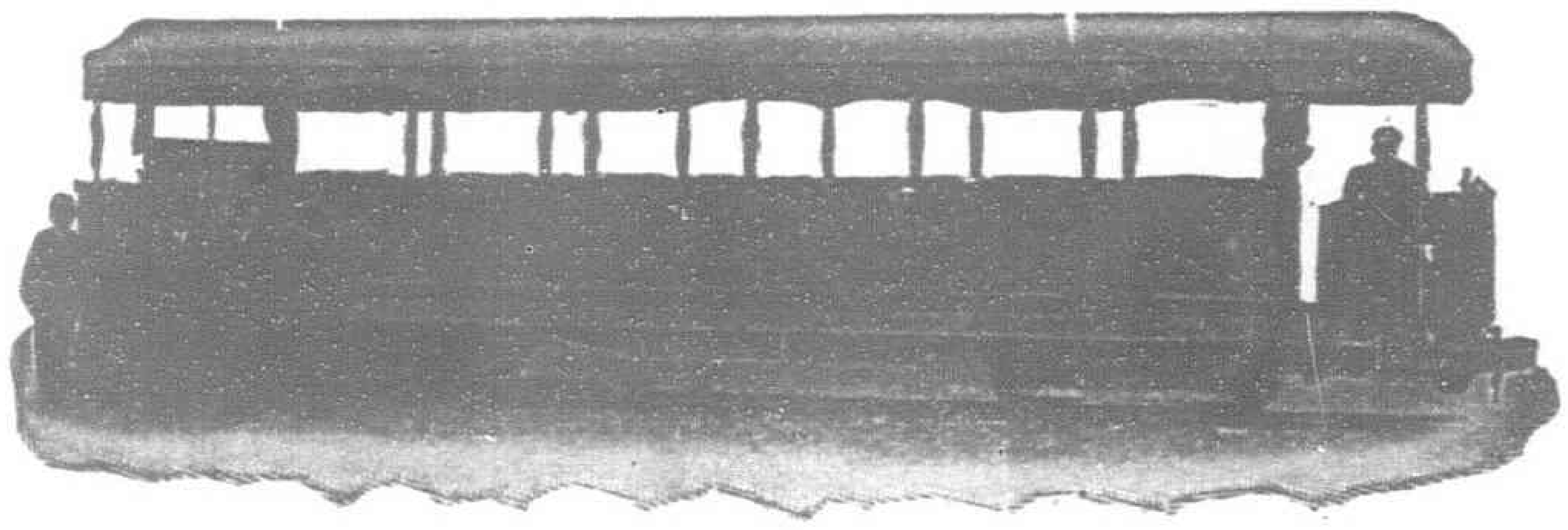

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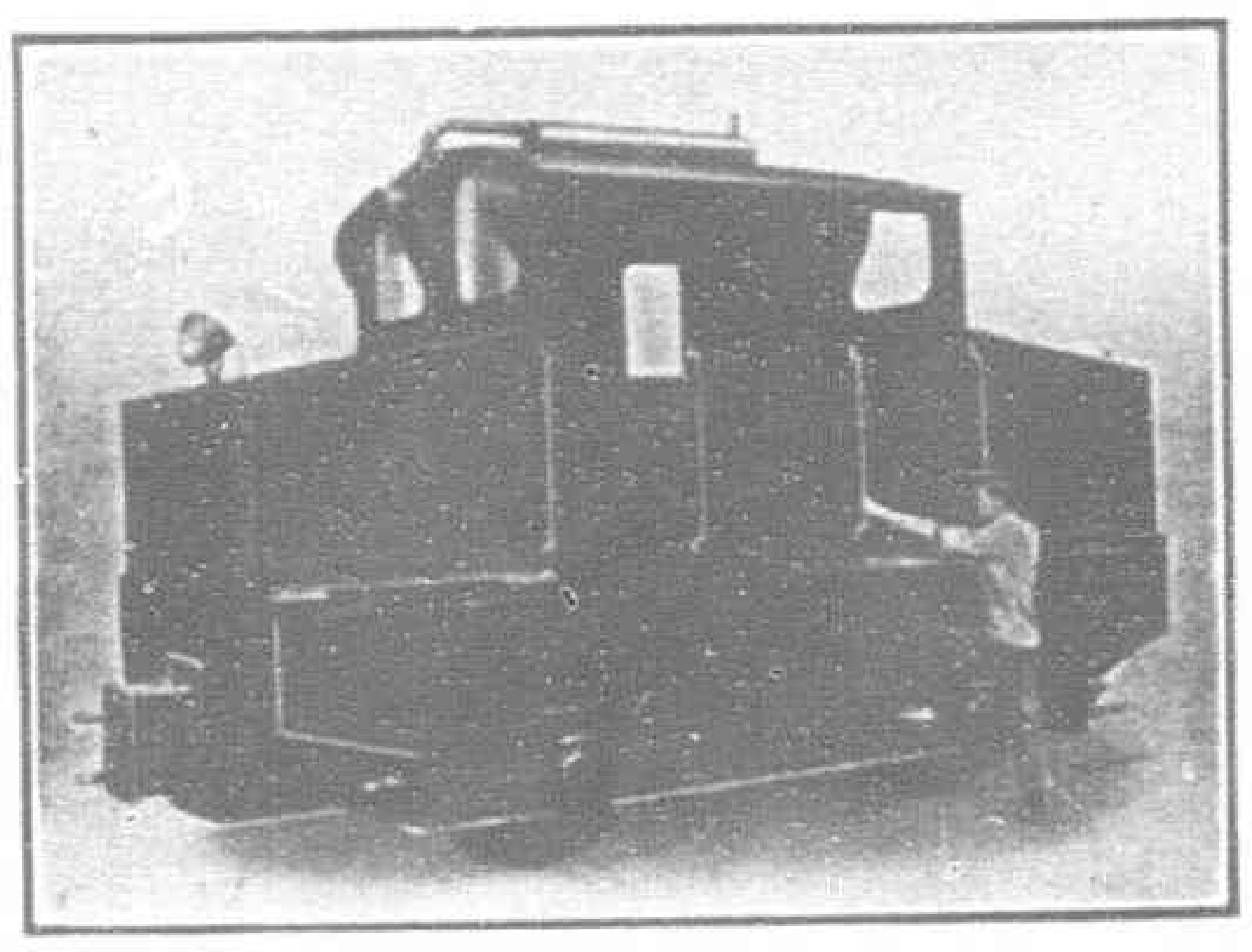

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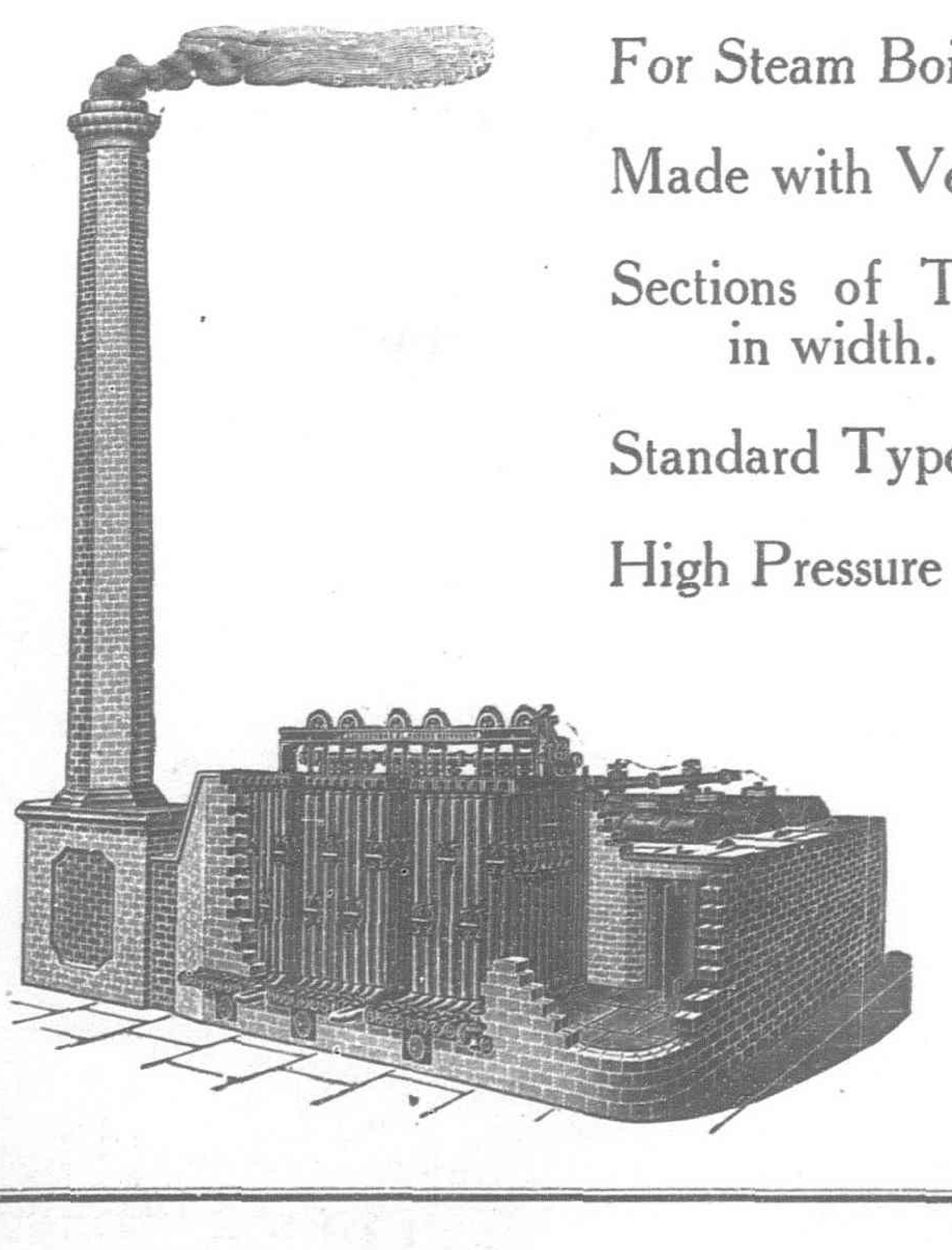

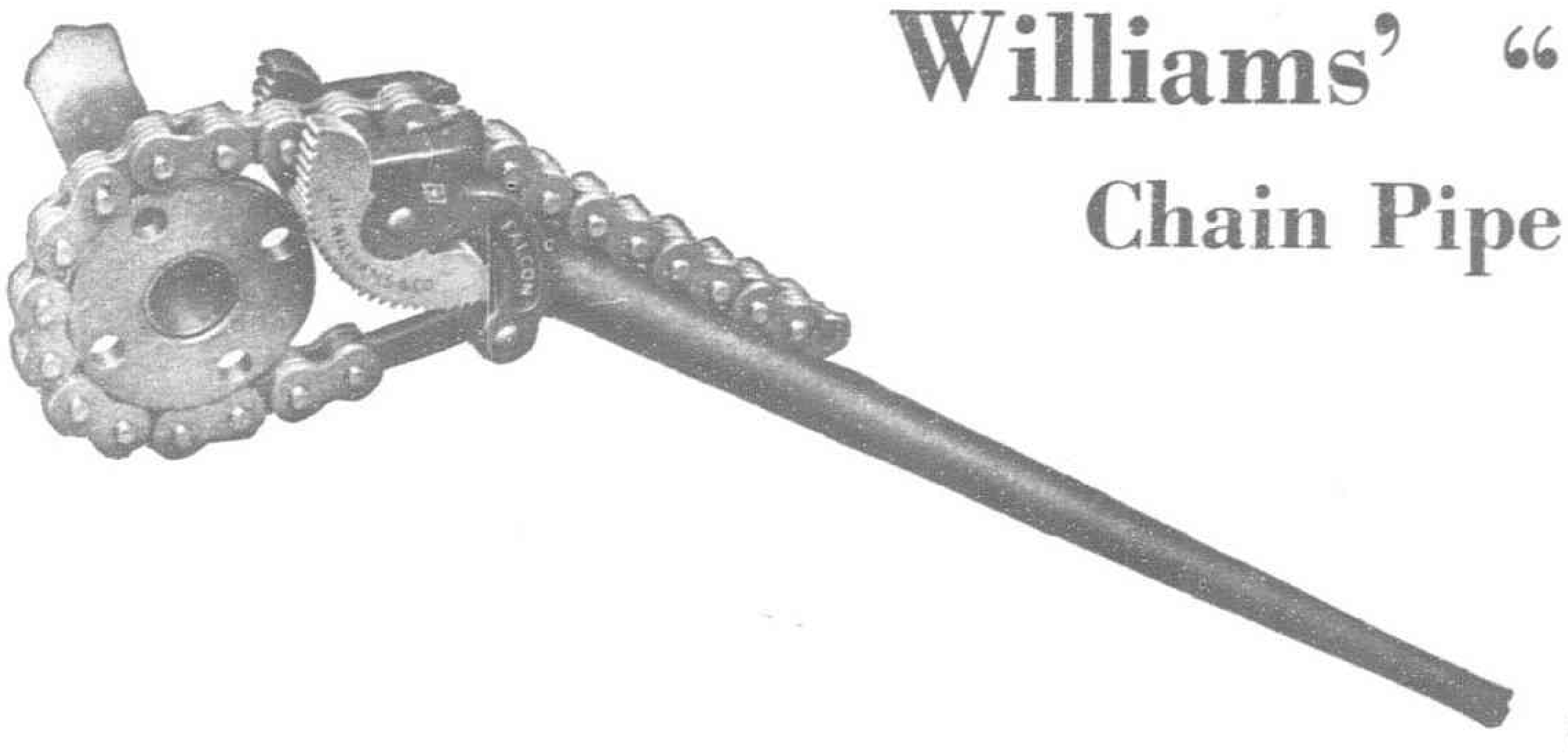

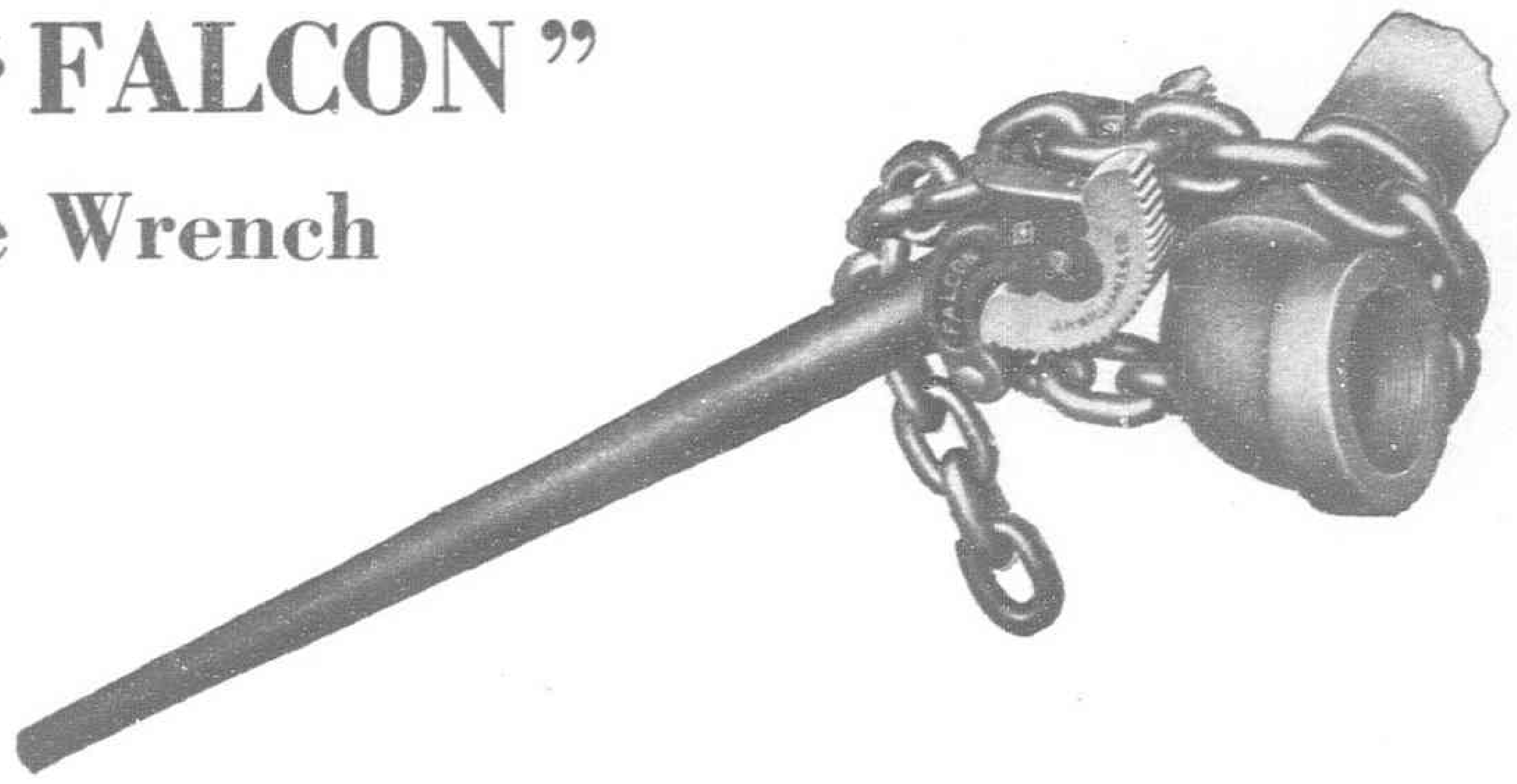

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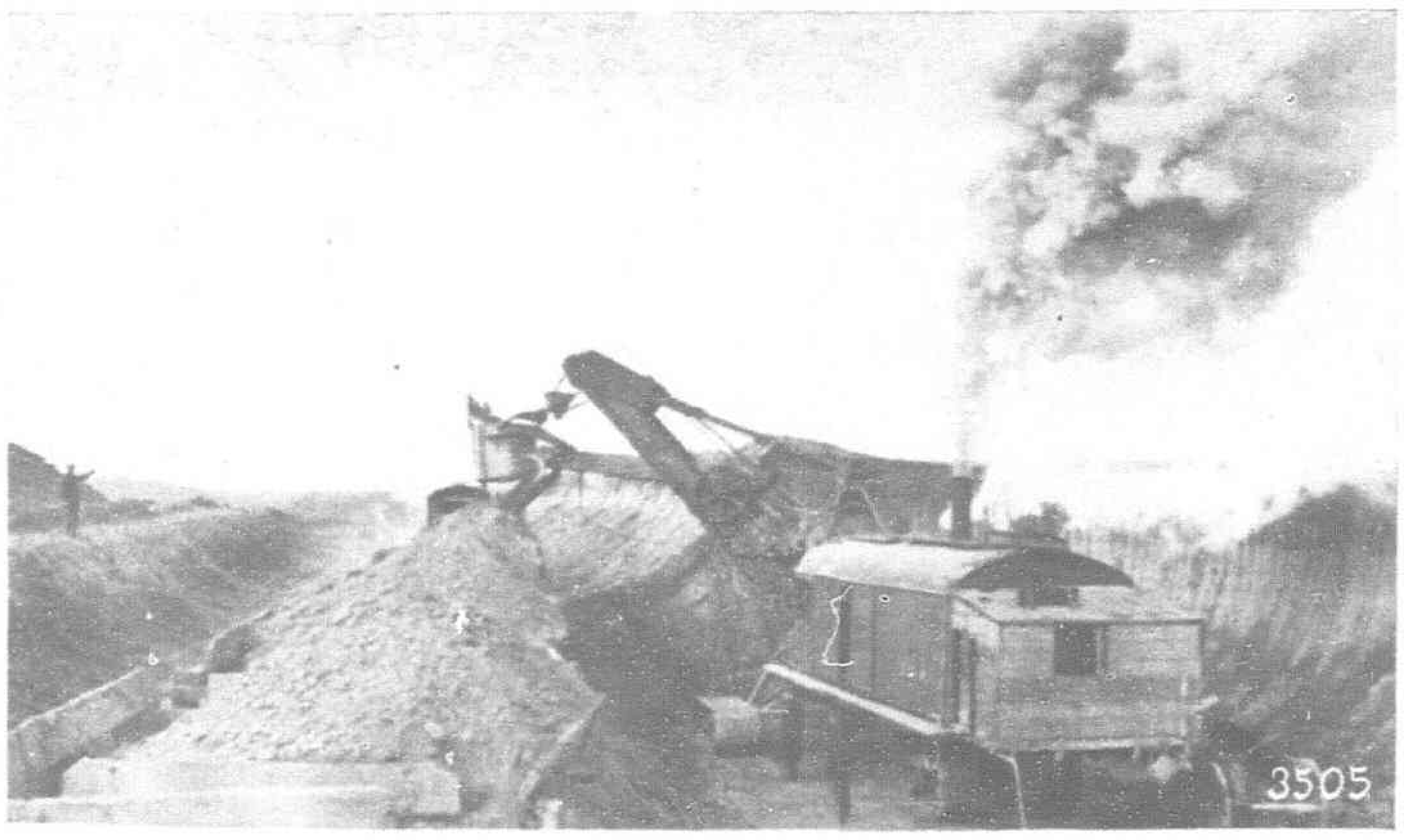


BUCYRUS RAILROAD-TYPE SHOVELS

Protect You From Expensive Delays And Breakdowns

Over 40 Years Experience Has Taught Us Where To Put Weight Where It Is Of The Most Lasting Value To The Operator

YOU CAN DEPEND UPON A BUCYRUS

Bucyrus Caterpillar Mounting Increases The Shovel Output By 20 to 30 Per cent.—It Will Pay You To Investigate

Built In Sizes From 2½ to 6 Yds. Capacity Steam and Electric

BUCYRUS

Established 1880 *Trade Mark Registered*

BUCYRUS COMPANY, South Milwaukee, Wis.

Cable Address: "BUCYRUS SOUTH MILWAUKEE"

London Office: BUCYRUS COMPANY, 19, Iddesleigh House, Caxton Street, Westminster.

Tokyo Office: BUCYRUS COMPANY, Imperial Hotel, Tokyo, Japan

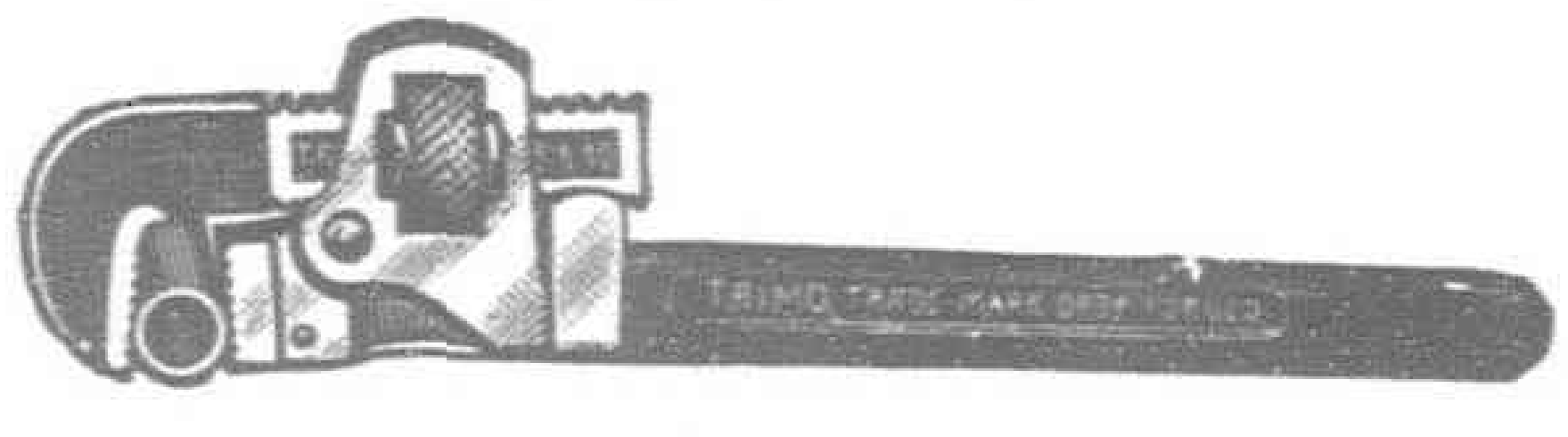
Agents in Siam:
D. Cooper-Johnston & Co.,
Bangkok.

Agents in India:
McLeod & Co., Calcutta

Agents in Japan:
Mitsui Bussan Kaisha,
Ltd., Tokyo.

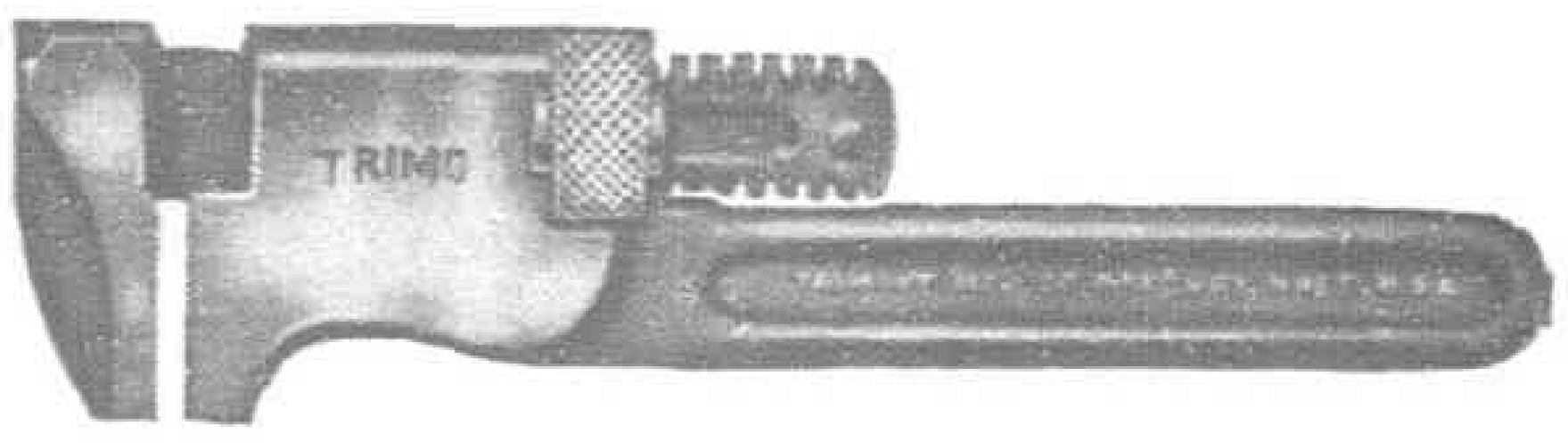
107

TRIMO TOOLS

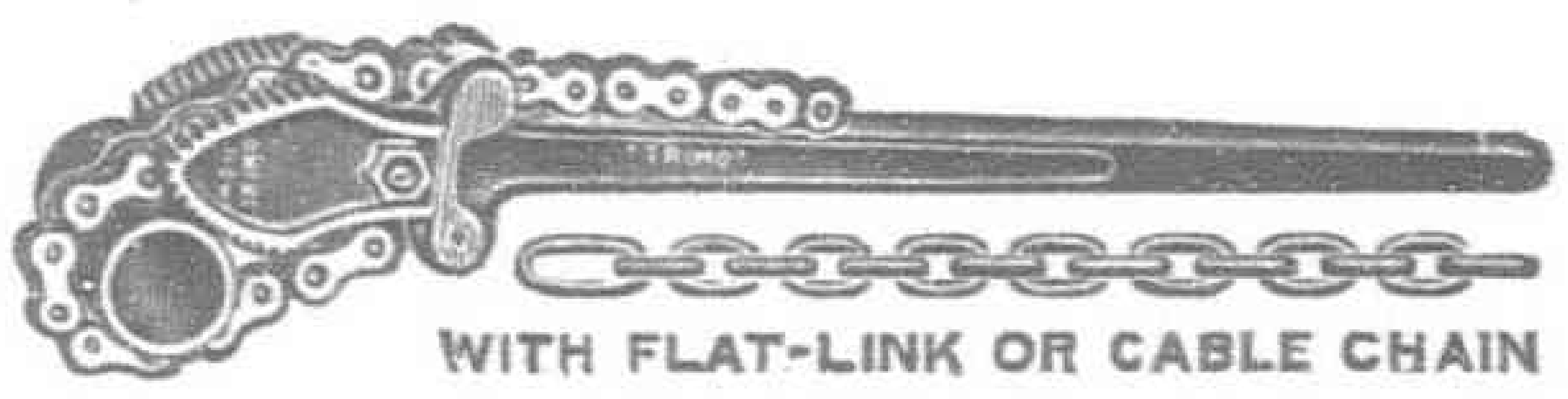


Trimo Pipe Wrench
in 8 sizes take pipe up to 8 inches

Trimo Pipe Cutter
in 3 sizes cut pipe up to 3 inches



Trimo Monkey Wrench
made in 7 sizes—6-in. to 21-in.



Trimo Chain Wrench
in 8 sizes take pipe up to 16 inches

These four superior tools should be in the hands of every user and on the shelves of every seller.

They are made on honor and sold fully guaranteed by the manufacturer.

Can be had through any importer of hardware.

Manufactured By:

TRIMONT MANUFACTURING CO.

Established since 1888 at
ROXBURY (Boston), Mass., U. S. A.

S F SALE & FRAZAR S F

LIMITED
No. 1 Yayesucho, Kojimachi-Ku
TOKYO
Central Post Office Box No. 18

IMPORTS EXPORTS

Telegraphic Address: Since 1834 The Name "FRAZAR" For All Offices has been Connected
WITH
ORIENTAL TRADE

BRANCHES - - - - -	Yokohama, Kobe, Osaka, Kyoto, Moji, Hakodate, Nagoya, Keijo (Korea), Taihoku (Formosa) Mukden (Manchuria), Vladivostok (Siberia.)
AFFILIATED COMPANIES -	FRAZAR & CO., 30 Church St., New York, and Paris, Seattle, San Francisco. FRAZAR TRUST CO., LTD., Tokyo and Yokohama. FRAZAR FOREIGN TRADE BUILDING CO., New York.
CORRESPONDENTS - -	SALE & CO., 21 Old Broad St., London, E.C. F. G. SALE & SONS, 20 Bishops Gate, London, E.C. E. W. FRAZAR & CO., 5 Rue de Paris, Tientsin and Peking, Harbin, Mukden.

WORLD-WIDE CONNECTIONS
EXCLUSIVE AGENCIES IN ALL LINES
LARGE STOCKS

A FEW OF OUR AGENCIES

MANY OTHER EXCLUSIVE AGENCIES

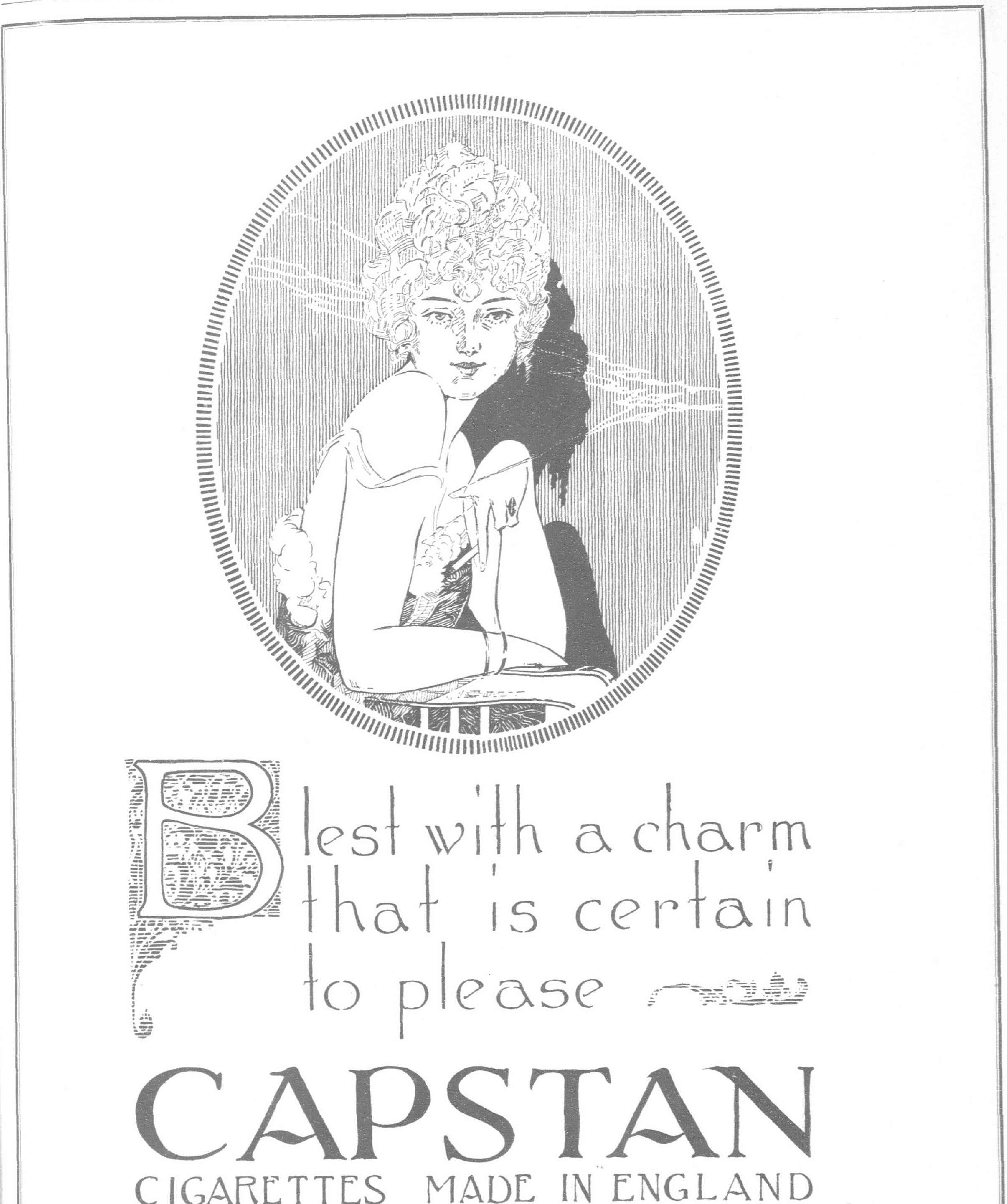
MOTORCARS, TRUCKS, TRACTORS, ETC. Ford Motor Co., Hupmobile Motor Car Corp Franklin Motor Car Co., Armstrong Siddeley Co., Ltd., Rolls Royce Co., Ltd., The White Co (Trucks), Splitdorf Electrical Co.
MACHINE TOOLS. Joseph T. Ryerson & Son, Giddings & Lewis Mfg. Co., Wm. Sellers & Co., Inc.
RAILWAY EQUIPMENT. Baldwin Locomotive Works, W. H. Miner, Griffin Wheel Co,, Duff Mfg. Co.
AVIATION EQUIPMENT: Handley Page, Ltd.
BRITISH STEEL and STEEL PRODUCTS. Jonas and Colver, Ltd., Smith & Coventry, Ltd., Sheffield Twist Drill & Steel Co., Ltd., Chubb & Son's Lock & Safe Co., Ltd.
CANNING MACHINERY and EQUIPMENT. American Can Co., Adriance Machine Works, Anchor Cap & Closure Co., Burpee and Letson Ltd., Seeley Brothers.
CANNED SALMON and CRAB from Kamchatka.
Fairbanks Morse & Co. Stationary and Marine Engines. Motors, Pumps, Wind Mills, complete Power and Lighting Plants.
Chain Belt Co., "Rex" Concrete Mixers.
J. L. Mott Iron Works, Plumbing Fittings and Supplies.
Shepard Electric Crane & Hoist Co., Cranes and Hoists.
Armour & Co., Canned Meats and Fruits, Soaps, Toilet Articles.
The Carnation Milk Products Co., "Carnation Cream."
The Glidden Co., Paints, "Jap-a-lac" Auto Finishes, Cold Water Paints, Wood Stains.
The Duratex Co., "Duratex" Leather Substitute and Rubber Coated Top and Curtain Materials.
S. C. Johnson & Son, Floor Wax, Paste, Liquid, and Powder.
The Klein Manufacturing Co., Technical Paints "Metal Crete" Concrete Hardeners, Cement Coating.
The Tungsten Wire Works (Stockholm), Wires for Filaments.
The Victor Talking Machine Co., Machines and Records.
The Graphoscope Development Co., Projectors and Films.
The Victor Typewriter Co., Standard Typewriters.
The Corona Typewriter Co., Folding Typewriters.
The Rolex Watch Co., Ltd., "Rolex" Watches.
Simmons Hardware Co., "Keen Kutter" and "Oak Leaf" Brands of Tools and Cutlery.
The Gillette Safety Razor Co., "Gillete" Blades.

ROAD, EXCAVATING, POWER HOUSE, REFRIGERATING MACHINERY: STEEL and IRON PRODUCTS: "Gould" STORAGE BATTERIES.

RADIO APPARATUS, HEATING EQUIPMENT, FERTILIZERS, SAWN TIMBER CHEMICALS.

OUR SERVICE also covers BONDS and INVESTMENTS, FIRE and MARINE INSURANCE, SHIPPING, STORING, CHARTER, SALE and PURCHASE of STEAMERS.

INQUIRIES SOLICITED . If we cannot Supply your Requirements from Stock, we will be pleased to Recommend Local Alternatives or Advise Regarding Imports.



Blest with a charm
that is certain
to please

CAPSTAN
CIGARETTES MADE IN ENGLAND

This advertisement is issued by the British American Tobacco Co. (China) Ltd

B28

JAPANESE
TEXTILES
FOR EXPORT

Standard Printed and Dyed Cotton and Silk Fabrics

SHIRTINGS
PRINTS
DAMASKS
SHEETINGS
CRETONNES
TOWELING
DRILLS
FLANNELETTES
CREPES
ETC. ETC.

PONGEES
CREPES
BROCADES
SILKS
SATINS

FUJI GASSED SPINNING COMPANY, LIMITED
(FUJI GASU BOSEKI KABUSHIKI KAISHA)

Head Office:
GOCHOME, OSHIMA-MACHI
NEAR TOKYO
CABLE ADDRESS: "FUHO"

CAPITAL - Yen 38,000,000
OPERATING
450,000 Spindles and
1,775 Looms

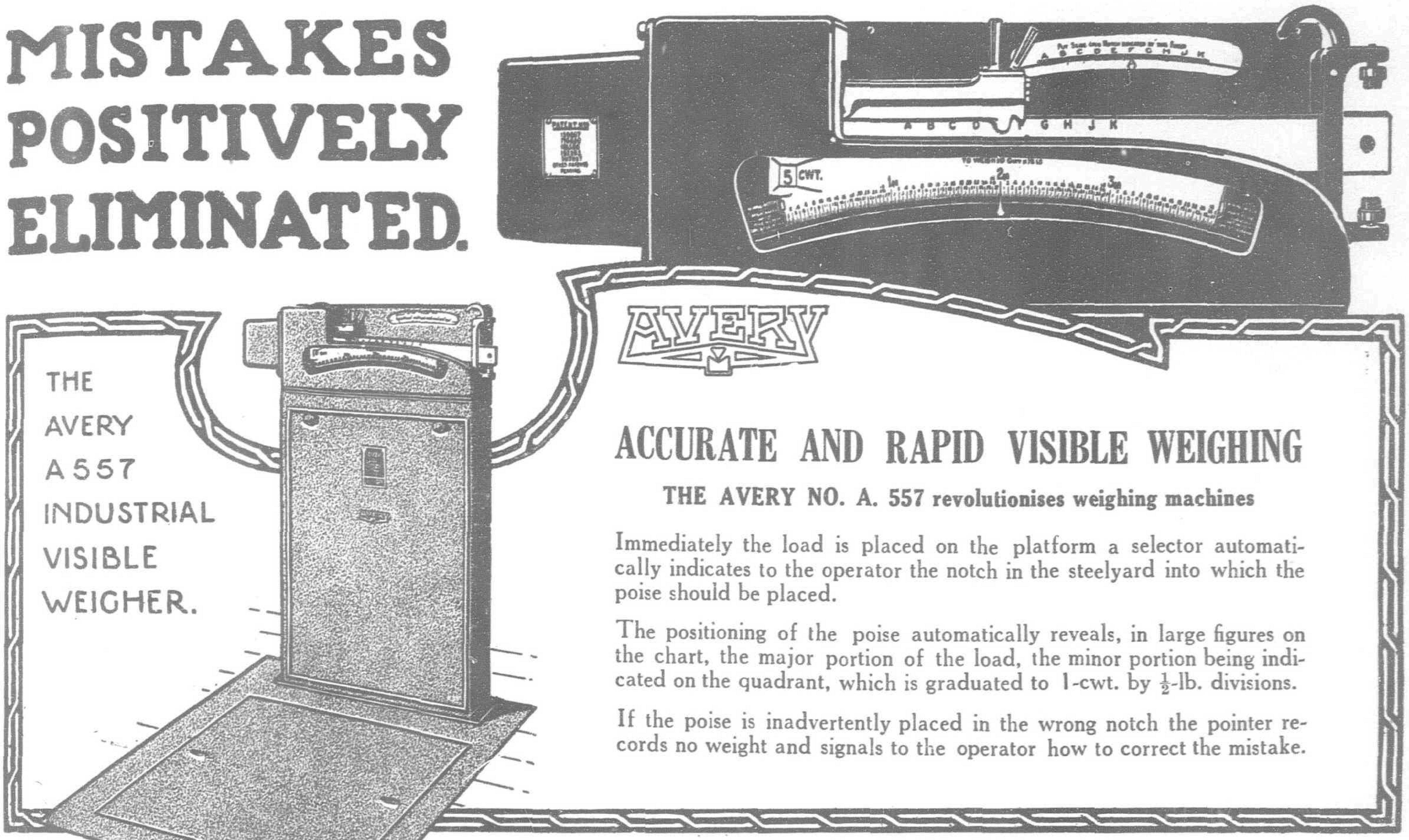
Business Office:
SHICHOME, HAKOZAKI-CHO,
NIHONBASHI-KU,
TOKYO

Silks, Crepes, Brocades, Cotton
Cloths, Muslins

SILK AND COTTON YARNS, NOILS, etc.

OUR EXPORT DEPARTMENT
IS REPRESENTED IN ALL THE IMPORTANT COMMERCIAL CENTERS OF THE WORLD AND CAN FURNISH PROMPTLY FULL INFORMATION AND QUOTATIONS REGARDING THE LARGE VARIETY OF TEXTILES MADE IN OUR MILLS

KANEGAFUCHI SPINNING COMPANY, LIMITED
HIGASHI-SHIRIIKE, KOBE, JAPAN



MISTAKES
POSITIVELY
ELIMINATED.

AVERY

THE
AVERY
A557
INDUSTRIAL
VISIBLE
WEIGHER.

ACCURATE AND RAPID VISIBLE WEIGHING

THE AVERY NO. A. 557 revolutionises weighing machines

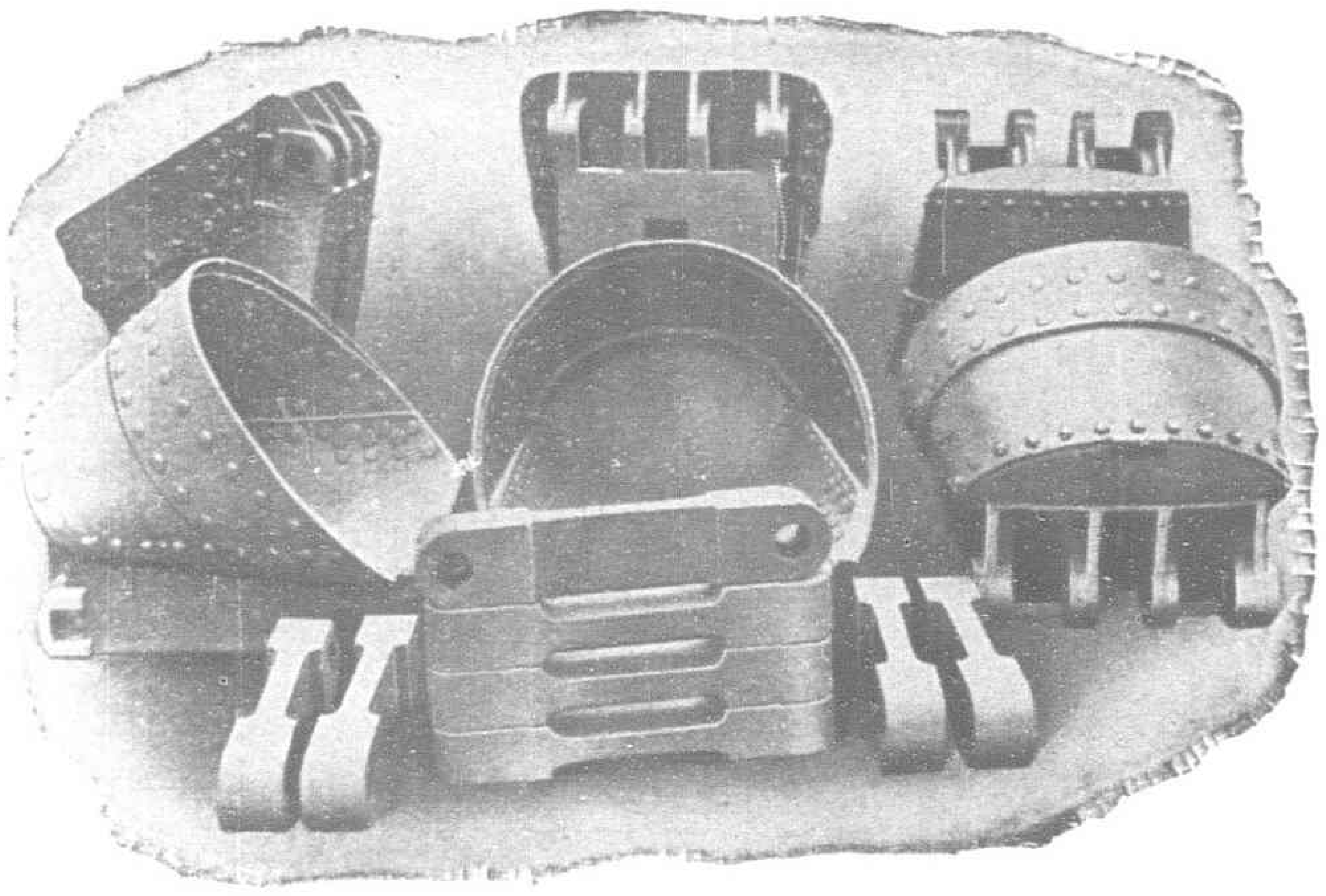
Immediately the load is placed on the platform a selector automatically indicates to the operator the notch in the steelyard into which the poise should be placed.

The positioning of the poise automatically reveals, in large figures on the chart, the major portion of the load, the minor portion being indicated on the quadrant, which is graduated to 1-cwt. by ½-lb. divisions.

If the poise is inadvertently placed in the wrong notch the pointer records no weight and signals to the operator how to correct the mistake.

AGENTS FOR CHINA— AD 1063

THE JARDINE ENGᴿ CORPORATION LTD SHANGHAI.



"Imperial"
Manganese Steel

"Imperial" Manganese Steel, whether used for the lips of dredger buckets, the bucket chain links, pins or bushes, means fewer stoppages due to breakage or rapid wear. As an example, the following extract from a letter may be quoted: "Up to the time I left West Africa the three bucket dredgers (gold dredging)

did not break a pin.

One dredge has been at work nearly two years, and the other two six months. I think the wear of the pins constitutes a record." What would a record like that mean to you in money saved?

The Makers of "Imperial" Manganese Steel

are

Edgar Allen
& Co Ltd
Imperial Steel Works
Sheffield

CHINA
Agents:
THE JARDINE ENGINEERING
CORPORATION, LTD.
8a Yuen-Ming-Yuen Road, Shanghai
and at
Hongkong, Hankow, Tientsin,
Peking, Etc.

JAPAN
Branch Office:
EDGAR ALLEN & CO., LTD.
2 Mitsu Bishi Buildings,
1 Yaesu-Cho, Kojimachi Ku, TOKYO

THE JARDINE ENGINEERING CORPORATION, LTD

Registered Office: 8a YUEN-MING-YUEN ROAD, SHANGHAI

Branches: Hongkong, Hankow, Tientsin, Peking, Harbin, Mukden and Taiyuanfu

ENGINEERING SUPPLIES AND MACHINERY

LARGE STOCKS CARRIED IN

SHANGHAI, HONGKONG, HANKOW, TIENTSIN

Including:—

MACHINE TOOLS OF EVERY DESCRIPTION,
STEAM ENGINES AND BOILERS,
GAS, GASOLINE AND OIL ENGINES,
PUMPS, TOOL STEELS, PULLEYS,
SHAFTING, BELTING, PAINTS,
"CHUBB" SAFES AND LOCKS,
"AVERY" WEIGHING MACHINES,
WIRE ROPES FOR ALL PURPOSES,
ELECTRIC LIGHTING SETS, MOTORS
AND ELECTRIC ACCESSORIES,
DIVING APPARATUS, Etc. Etc.

EXPERT STAFF IN SHANGHAI

CONTRACTORS

FOR THE SUPPLY OF

COTTON SPINNING AND WEAVING MACHINERY, FLOUR AND CORN MILLING MACHINERY, ELECTRIC LIGHT AND POWER PLANTS, INDUSTRIAL PLANTS FOR ALL PURPOSES

DESIGNERS AND BUILDERS OF MOTOR BOATS

ESTABLISHED 1835

HORSFALL & BICKHAM, LTD.

CARD CLOTHING

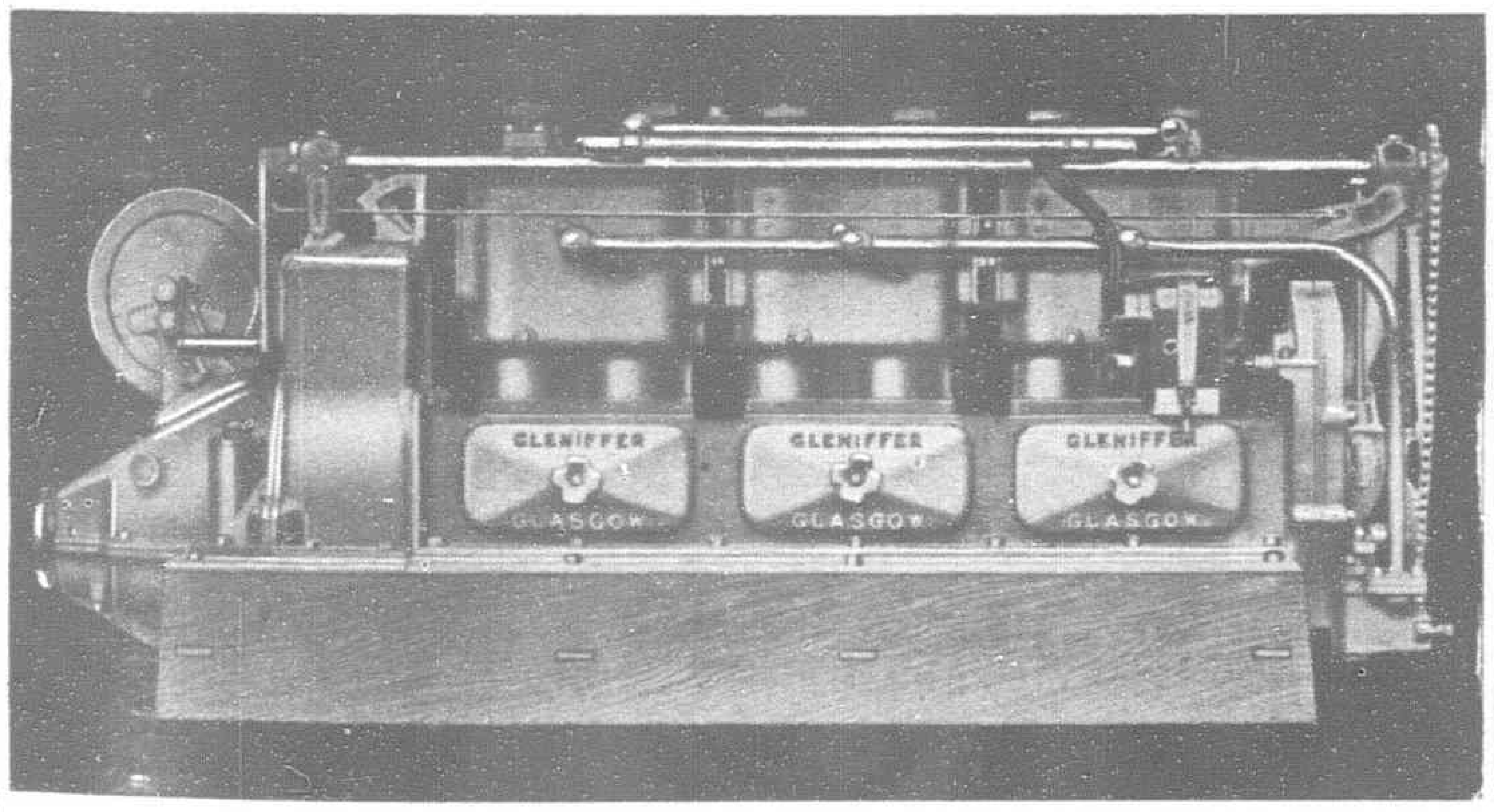
MANCHESTER, ENGLAND

SOLE AGENTS IN CHINA:

THE JARDINE ENGINEERING CORPORATION LIMITED, SHANGHAI.

STOCKS CARRIED IN SHANGHAI AND TIENTSIN.

GLENIFFER MARINE MOTORS



36/42 H.P Paraffin Engine and Reverse Gear

A sound British engineering job of compact and clean design. All working parts entirely enclosed, thus ensuring silent and clean running.

Range of Models—12 to 90 H.P.

Agents: China and Hongkong—The Jardine Engineering Corporation, Ltd., at Shanghai and Hongkong.

F.M.S. & Straits Settlements—Ritchie & Bisset, 23-25 The Arcade, Singapore

GLENIFFER MOTORS, LTD.,
ANNIESLAND, GLASGOW, SCOTLAND

Contractors To:
- The Admiralty.
- The War Office.
- The India Office.
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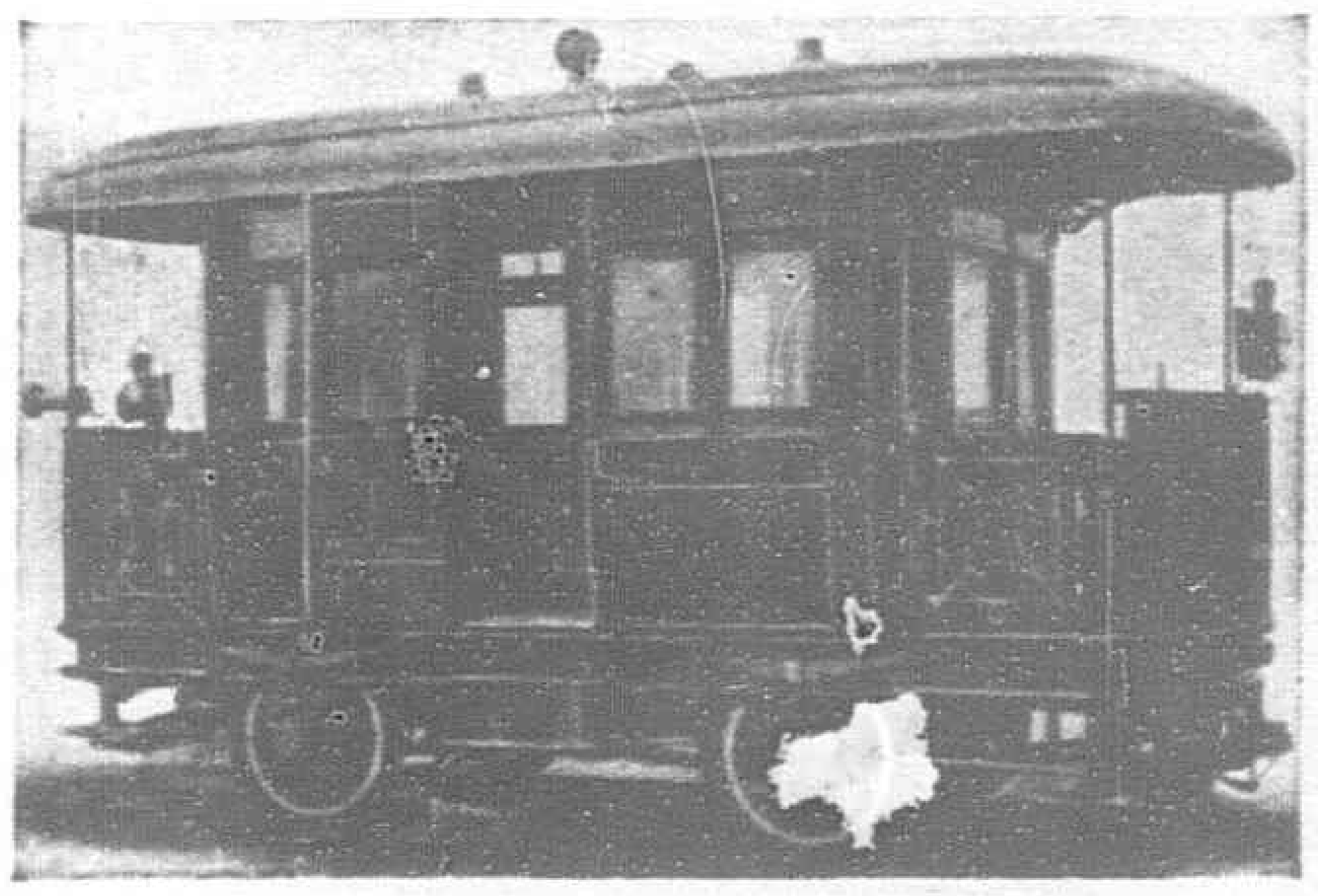


Four-Wheel Private Coach

THE DREWRY CAR CO., LTD.,

13 SOUTH PLACE,
LONDON, E.C.2.

Telegrams: "Effervesce" London.
Works: Burton-on-Trent, England.

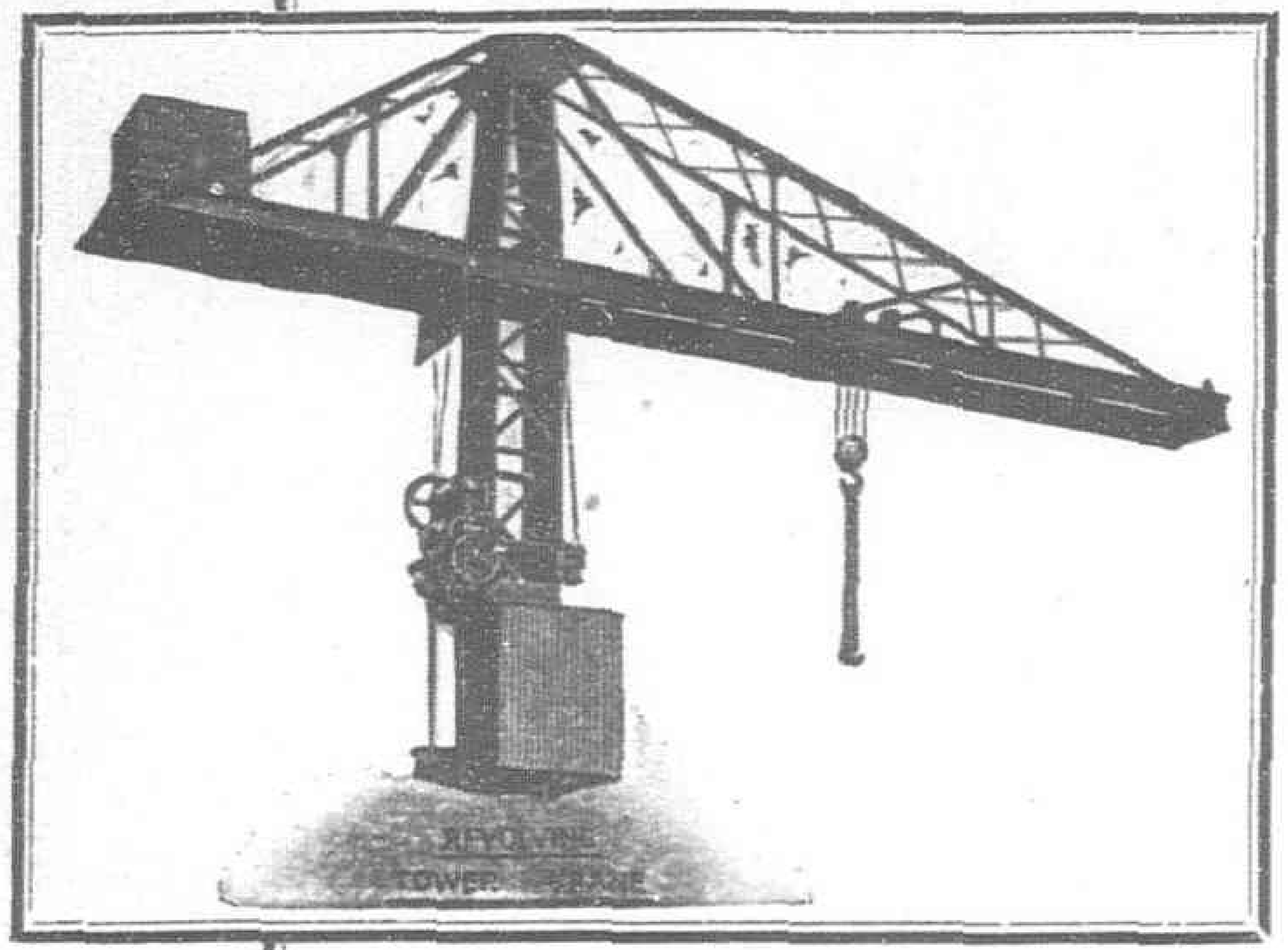
INTERNAL COMBUSTION

RELIABILITY
ECONOMY
SIMPLICITY

LOCOMOTIVES
RAIL MOTOR CARS
COACHES - TRAM CARS
LIGHT RAIL INSPECTION CARS

Agents in China:
THE JARDINE ENGINEERING CORPORATION, LTD.
8a Yuen-Ming-Yuen Road, Shanghai
FULL PARTICULARS ON APPLICATION

CHAMBERS, SCOTT & CO., LTD.



SPECIALISE IN

CRANES
WINCHES
HOISTING & MACHINE TOOL PLANT

SHIPMENTS UNDERTAKEN

Cablegrams: "ENERGY"
Codes: Bentley, Marconi
A.B.C. Western Union

MOTHERWELL, Nr. GLASGOW

Branch Offices : London and Liverpool

The Complete Gasification of Coal

OFFERS

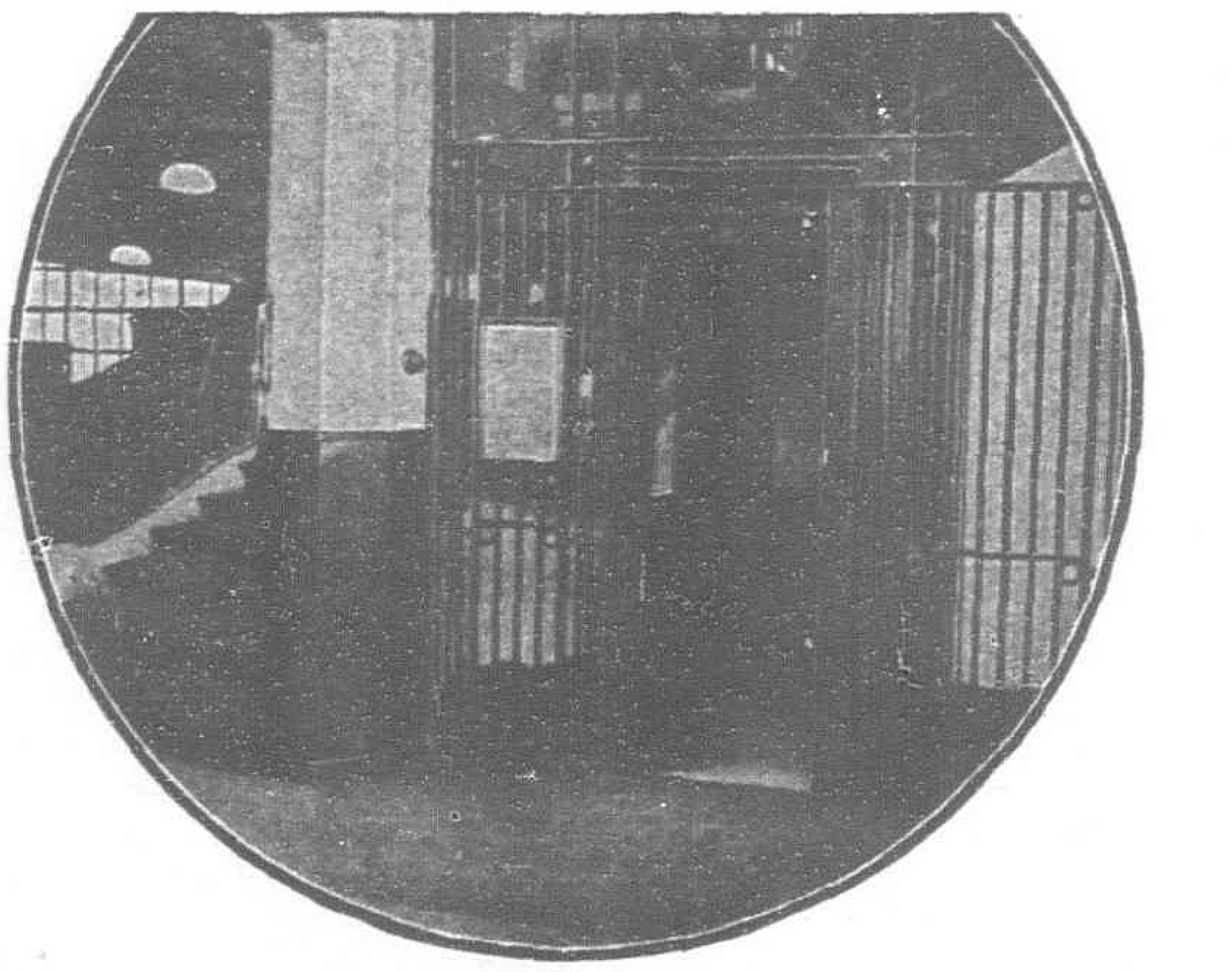
A gaseous yield of 17,500,000 B. Th. Us. per ton of coal carbonized.
Low capital cost for Plant.
The gas produced has a calorific value of 350 B. Th. Us. per cubic foot, with an extremely high flame temperature.
One man operates the Plant.

GAS & FUEL PLANTS, LIMITED

40/43 NORFOLK STREET, STRAND, LONDON, W.C.2.

Cables: Damper, Estrand, London.
Codes: A.B.C. 5th Edition, Bentley's Engineering.

E.C.M. LIFTS



E.C.M. Lifts—electric or otherwise—achieve a degree of efficiency which makes the users regard their cost as a real investment in property. Working drawings and full instructions for erection are sent with overseas installations.

ETCHELLS, CONGDON & MUIR, Ltd.

MILL STREET, ANCOATS,
MANCHESTER, ENGLAND

Where there's Pressure

CONSOLIDATED
Form H
Safety Valve

CONSOLIDATED
Form DI
Safety Valve

CONSOLIDATED
Safety Valve
"House Heater" Type

Consolidated Safety Valves Have An Absolute Positive Action

Relief of overpressure must be both adequate and certain. Some valves pop at the set point but do not relieve a sufficient volume of steam to prevent continuation of the rise in pressure. Others stick and fail to pop—an ever present menace to life and property. Still others fail to close.

These failures are never connected with the operation of Consolidated Safety Valves. Their relieving capacity is in most cases, anywhere from 50% to 300% greater than other makes of valves of equal size. Furthermore, they never stick—never fail to open at set pressures and always close when they should.

They are absolutely certain to prevent pressure from rising above the popping point of the valve under any condition which can possibly occur.

Our agents will be glad to quote you prices and to consult with you concerning the type best suited to your work. Consult them also about Ashcroft Gauges and Metropolitan Injectors—for many years an engineering standard throughout the world.

CONSOLIDATED SAFETY VALVES

MANNING MAXWELL & MOORE INC
M&M
TRADE MARK

Manning, Maxwell & Moore, Inc.

Pershing Square Building, 100 East 42nd Street,
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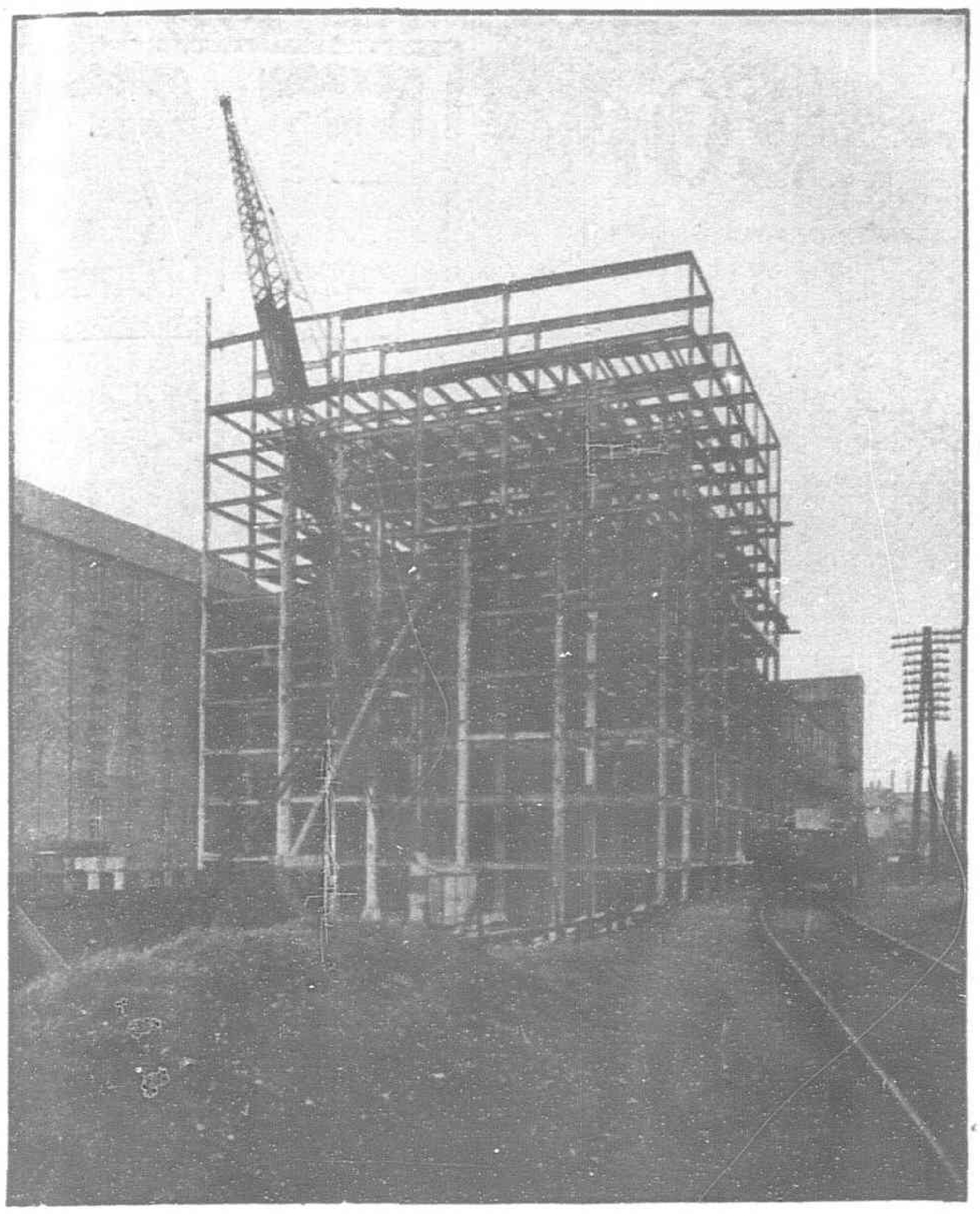
Agent for China:
Walworth International Co., 29 Szechuan Road, Shanghai, China

Agent for Japan:
Horne Co., Ltd., 6 Takiyama cho, Kyobashi Ku, Tokio



3,000 Tons Steel Frame Building of ten floors. This type of construction is suitable for all kinds of factories, warehouses, and retail stores. Fire risks reduced to a minimum.

Redpath Brown
Steelwork

IN constant demand at home and abroad for all classes of building and structural work—for Factories, Sheds, Warehouses, Bridges, Garages, Godowns, and Pithead Frames. State your requirements and we will supply designs and estimates. Enquiries from architects receive immediate and special attention. With our annual capacity of over 100,000 tons and stocks of steel in hand of 20,000 tons ready for fabrication we are in a position to proceed with the work at shortest notice.

AS Steel Merchants we are also ready to supply from stock, joists, channels, angles, flats, plates, bars, bolts and rivets.

REDPATH, BROWN & CO., LTD.

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EDINBURGH (Head Office):
2, St. Andrew Square.

GLASGOW:
19, Waterloo Street.

MANCHESTER:
Trafford Park.

NEWCASTLE-ON-TYNE:
Milburn House.

BIRMINGHAM:
47, Temple Row.

DUBLIN:
36, St. George's Quay.

BELFAST:
69, Scottish Provident Bldgs.

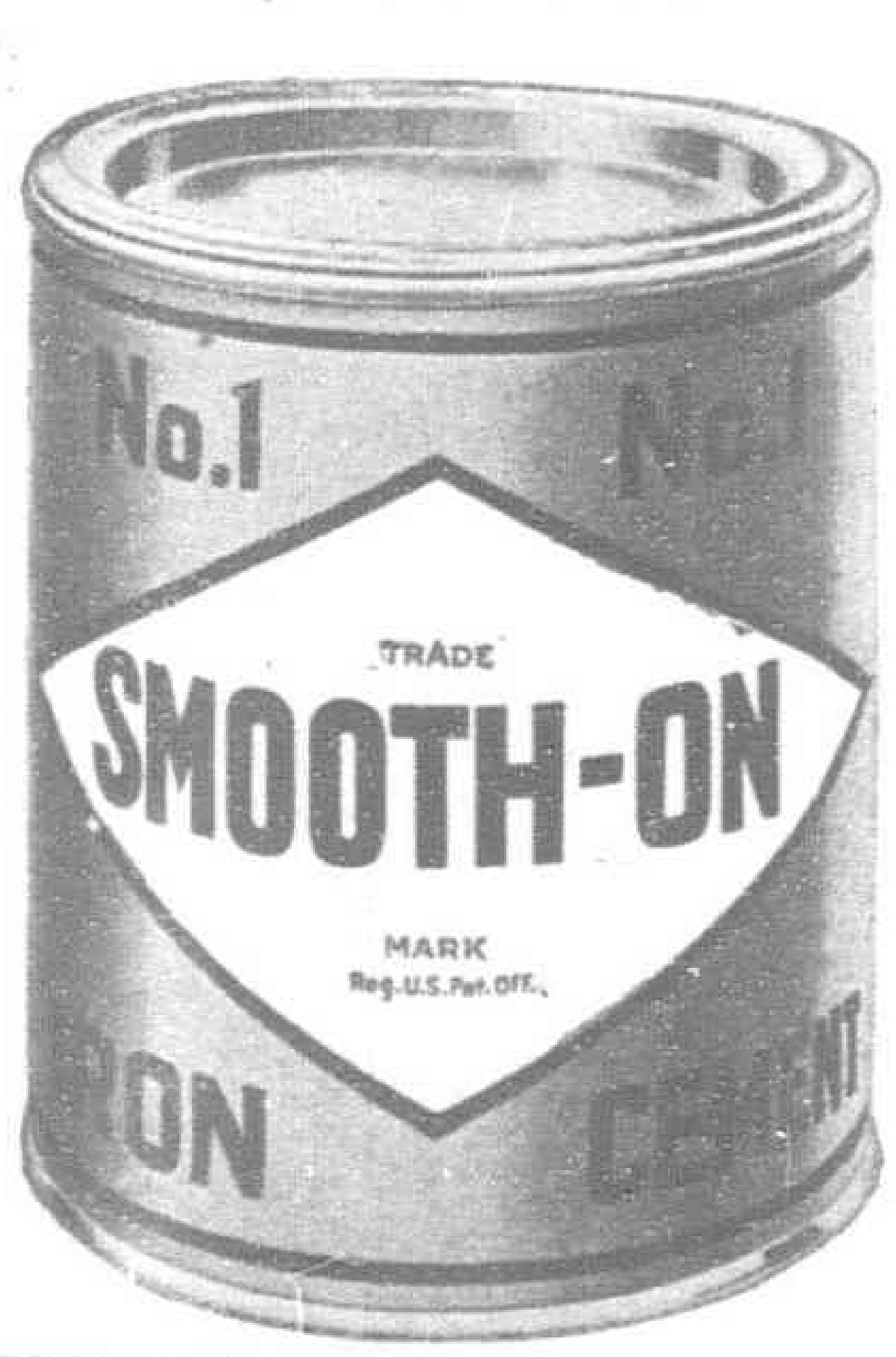
Cables: A.B.C. Sixth Edition, and Marconi International.

Japanese Representatives: Messrs. L. J. Healing & Co., Eiraku Buildings, Marunouchi, Tokyo.

Be the first to suggest SMOOTH-ON and get the credit for the saving!

Smooth-On is universally used for repairing cracked plates and castings, patching boilers and engine cylinders, stopping leaks in pressure joints, making seams tight at bolts and rivets, making flanged and screw-thread joints, stopping leaks in automobile radiators, etc. All of these repairs and many others are made with least effort and time loss and the results are permanent.

If you are not thoroughly familiar with Smooth-On, send for a free copy of our 144-page Instruction Book, which is virtually an Engineer's treatise.



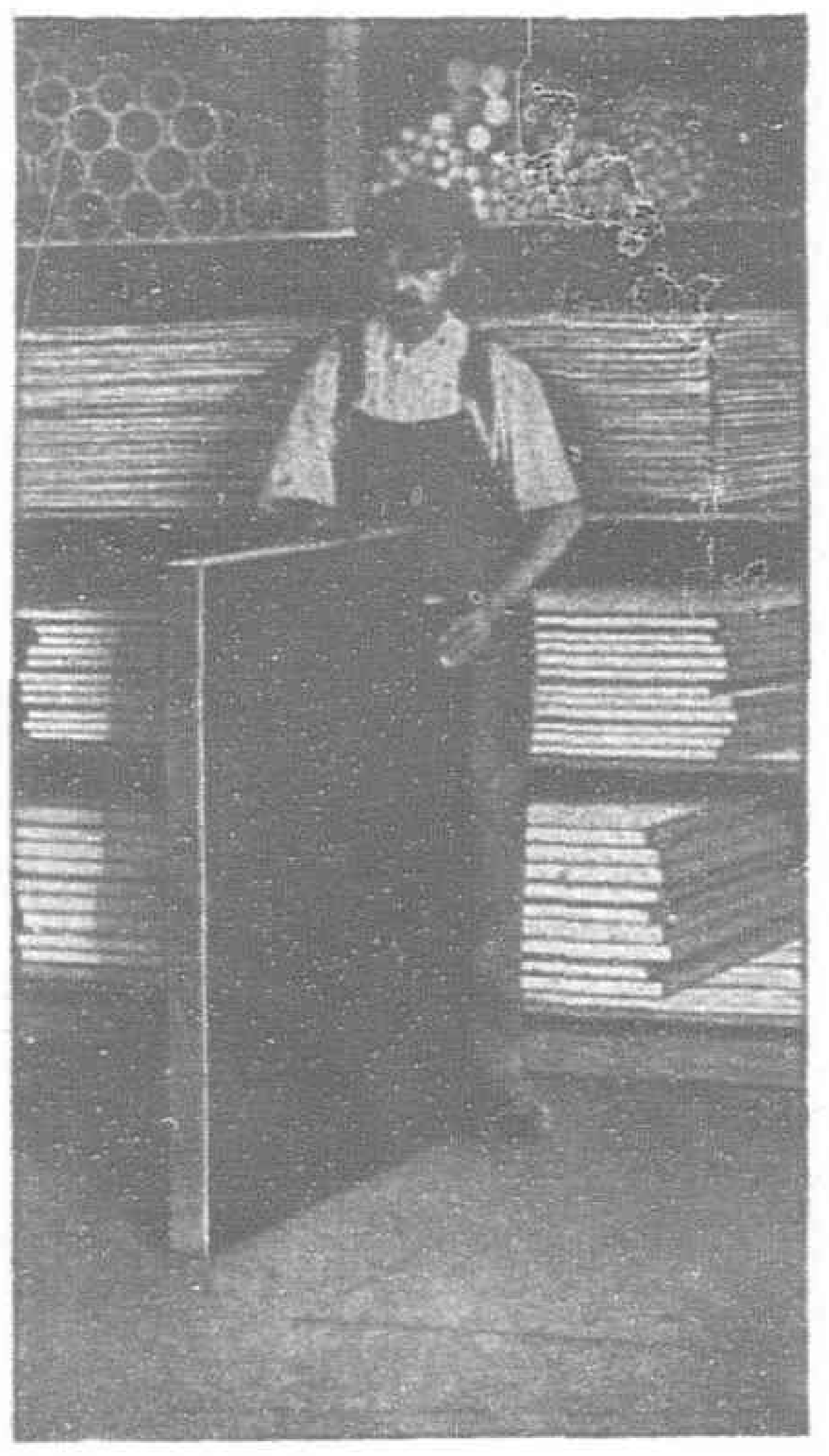
Sold by prominent Supply Houses throughout the Orient, and made by

Smooth-On Mfg. Co.,
570 Communipaw Ave.,
Jersey City, N.J., U.S.A.

Do it with **SMOOTH-ON**

INSULATE WITH

Diamond·Fibre



Diamond Fibre (a genuine vulcanized fibre) is an ideal insulating material manufactured in sheets, rods, tubes. From *Sheets* are made switch-bars, washers, gaskets, slots, buttons, wedges, cleats, etc. From *Rods* are made bushings, knobs, pins, handles, bars, etc. From *Tubes* are made conduits, flashlight tubes, bushings, etc.

Write for further details about this superior, reliable insulating material.

Diamond State Fibre Company

Established 1891

Bridgeport, Pa. (near Philadelphia), U.S.A. *Cable Address:* 'DYMNFYBR," Norristown

Representatives:

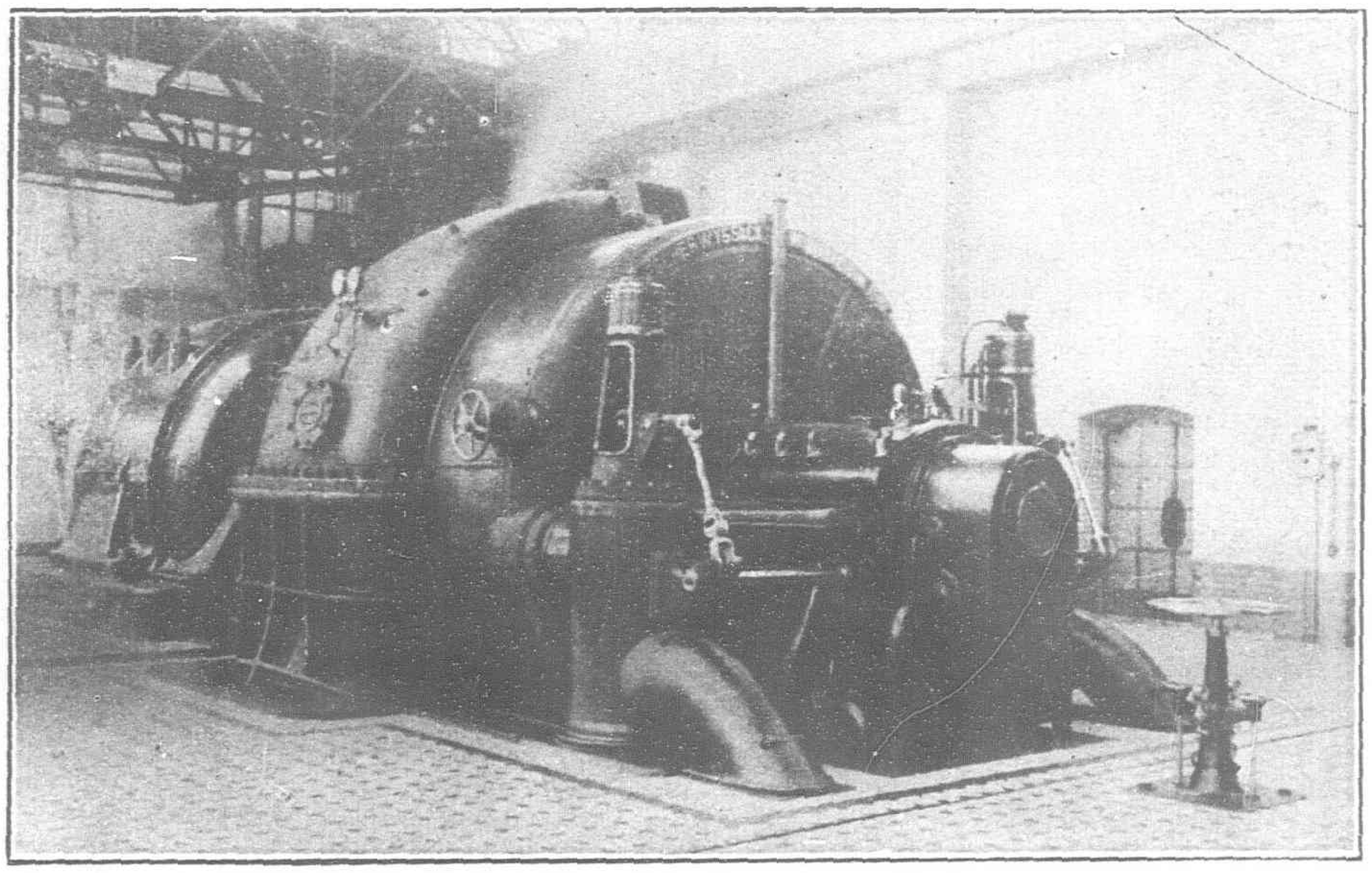
Diamond·F

American Trading Co., Dojima Building, Osaka, Japan
American Trading Co., 1 Yaraku-cho Itchome, Kojimachi-ku, Tokyo, Japan
American Trading Co., 3 Canton Road, Shanghai, China

ESCHER-WYSS & Co.

EWC

ENGINEERS AND CONTRACTORS
ZURICH, SWITZERLAND


30,000 K.W. Escher Wyss "Zoelly" Steam Turbogenerator

SPECIALITIES:

STEAM AND WATERTURBINES, STEAM BOILERS, SYSTEM GARBE, TURBO PUMPS AND COMPRESSORS, ICE- AND PAPER-MAKING MACHINERY

FAR EASTERN OFFICE

No. 320-322-324 Marunouchi Building
TOKYO

IRON AND STEEL TUBES

for Gas, Water, Air, Steam, Oil, Sewage, Irrigation & other purposes

Black and Galvanized Tubes and Fittings.
Boiler Tubes · Weldless Steel Tubes · Boring Tubes.
: Main Steam Pipe Installations. :
Tubular Steel Tramway & Electric Light Poles.
Ashford's Patent Tube Well Strainers.
Steel Plates, Steel Castings, Zinc Sheets.

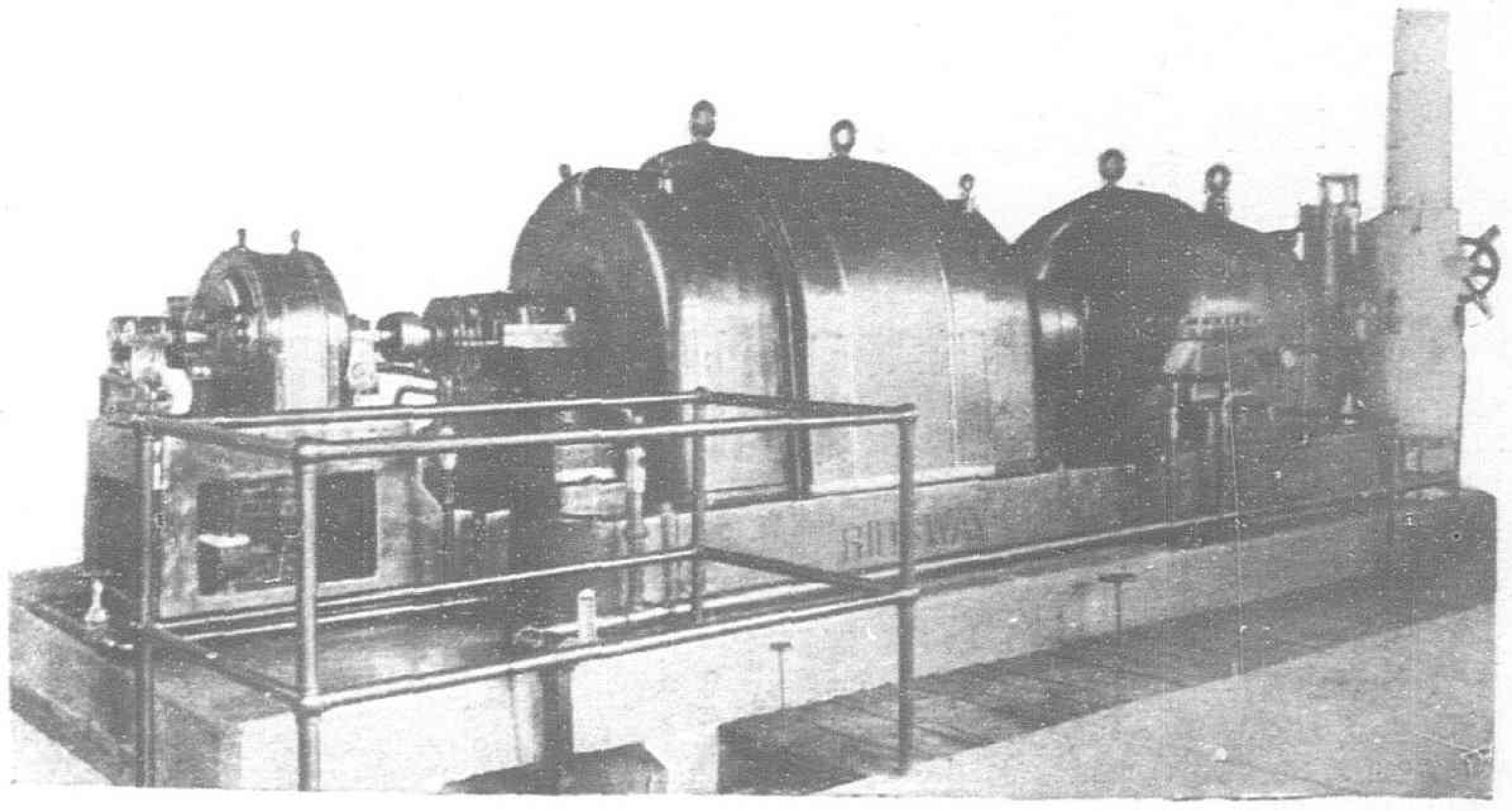
STEWARTS AND LLOYDS, LTD.

GLASGOW BIRMINGHAM LONDON
SHANGHAI OFFICE: 6 KIUKIANG ROAD

TO PRODUCE UNFAILING POWER ECONOMICALLY

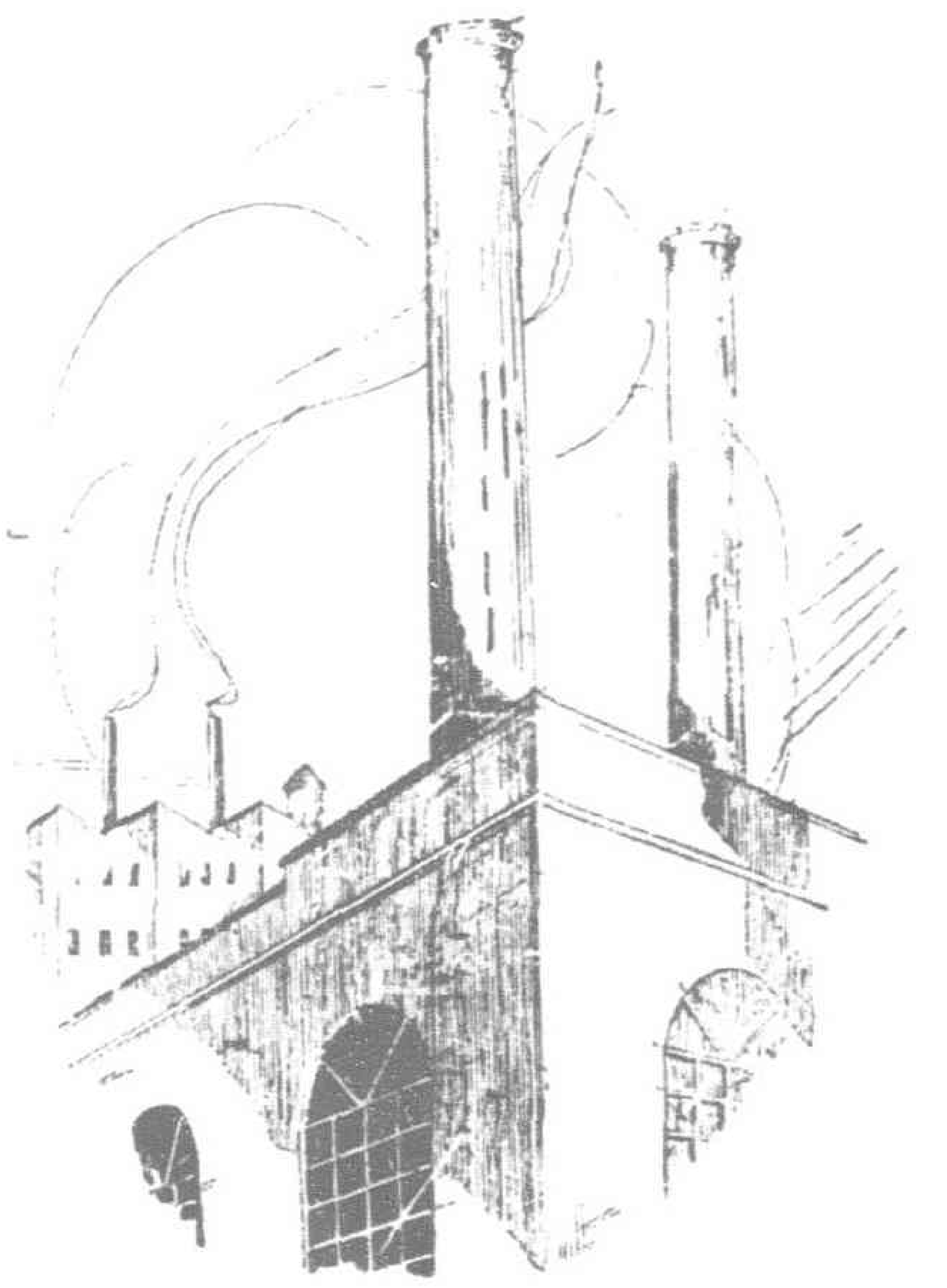
Ridgway Turbo-Alternators

increasing power output 60% to 100%



FOR additions to existing power plants in which there are non-condensing engines which are to be retained in service, a low or mixed pressure turbine is a good investment as it will increase the power output from 60% to 100%, using only the engine exhaust. If the supply of exhaust steam is variable or possibly will be insufficient, the mixed pressure turbine will take enough high pressure steam to maintain speed and carry the load, or will carry full load on high pressure steam only.

Ridgway turbines have especially large running clearances, simple, closely regulating governors and highly reliable and effective lubricating systems.



Ridgway Turbo-Alternators are especially adapted to large industrial plants and central stations.

Interesting Bulletins Free

Our latest bulletins cover the following subjects: Center-Crank Single-Valve Engines, Side-Crank Single and Four-Valve Engines, Unaflow Engines, Alternating-Current Generators, Direct-Current Generators, Motor-Generator Sets, Turbo-Generator Sets. Ask for the ones that interest you!

C. G. BROWN—Factory Representative
14 Canton Road, Shanghai, China.
RIDGWAY DYNAMO & ENGINE CO.
Cable Address: **"RIDRELCO"**

RIDGWAY
POWER UNITS

Cable Address:
"IWASAKISAL-TOKYO"

Code Used:
A. 1., A.B.C. 5th, Western Union, Bentley's Complete Phrase

MITSUBISHI SHOJI KAISHA, LTD.

(MITSUBISHI TRADING CO., LTD.)

Capital, fully paid-up - - - Y. 15,000,000

Head Office:

MARUNOUCHI, TOKYO.

Importers and Exporters, Manufacturers, Commission Merchants, Brokers, Ship Owners.

EXPORTING:

Coal, Copper and all Other Descriptions of Metals, Minerals and Cereals, Chemicals, Oil, Paper, Glass, Canned Fish, Silk Goods, and General Oriental Products and Merchandise

IMPORTING:

Iron, Steel, Machinery, Machine Tools, Chemicals, and General Merchandise

ANNUAL PRODUCTION:

Electrolytic Copper Ingots	20,000	Tons
Pig Iron	100,000	,,
Steel	50,000	,,
Coal	3,500,000	,,

COLLIERIES:

Takashima, Ochi, Yoshinotani, Kishidake, Namazuta, Shinnew, Hojo, Kanada, Kamiyamada, Ashibetsu, Bibai, O-Yubari, and Sakito

BRANCHES and AGENCIES:

Tokyo, Yokohama, Nagoya, Osaka, Kobe, Moji, Wakamatsu, Karatsu, Nagasaki, Otaru, Tsuruga, Kure, Muroran, Hakodate, Kushiro, Vladivostok, Dairen, Kirin, Harbin, Peking, Shanghai, Hankow, Hongkong, Canton, Tientsin, Tsingtao, Tsinan, Singapore, London, Paris, Lyon, Marseilles, Berlin, New York, Seattle

STEAMSHIP DEPARTMENT—KOBE

Fleet Owned	25,000	Tons Gross
Chartered Steamers	12,000	,, ,,

Regular and Irregular Routes between home ports and Chinese and South Sea Islands Ports, etc.

MIIKE COAL

The Finest Steaming and Bunker Coals of the Far East are mined from the famed Miike, Tagawa, Yamano Sunakawa and Kawakami Collieries operated by the

MITSUI

MINING COMPANY, LTD.

HEAD OFFICE:

No. 1 Surugacho, Nihonbashi-Ku,
TOKYO, JAPAN

Capital - - Yen 100,000,000

Annual Coal Output is equal to one-quarter of Total Japanese Mines.

LEAD, SILVER, GOLD, ZINC, COPPER, SPELTER, SULPHUR, COKE, IRON, CHEMICALS and DYES

Are produced from the Company's, KAMIOKA, Lead, Silver and Zinc Mine; SANO, Copper and Zinc Mine; KUSHIKINO, Gold Mine; KONGO, Tungsten Mine; IWAONOBORI, Sulphur and Metal Mine; Zinc Plants, Coke, Dyestuffs and By-products Establishments in Miike.

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Cable Address: Heinemann Sanctgeorgenschwarzwald. *Code*: A.B.C. 5th Edit.

Constructing as Specialty Since 40 Years

Every type of machines being constructed

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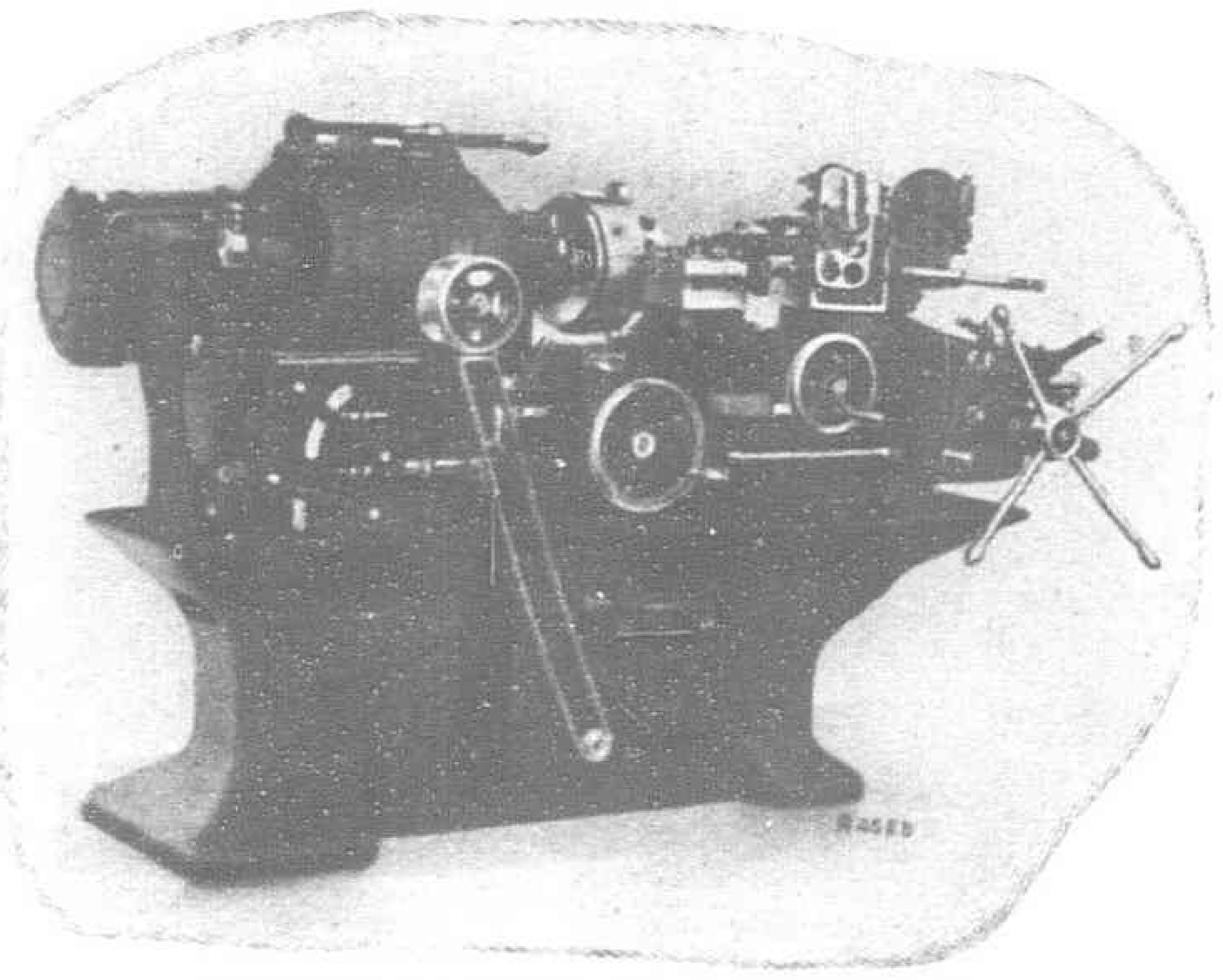
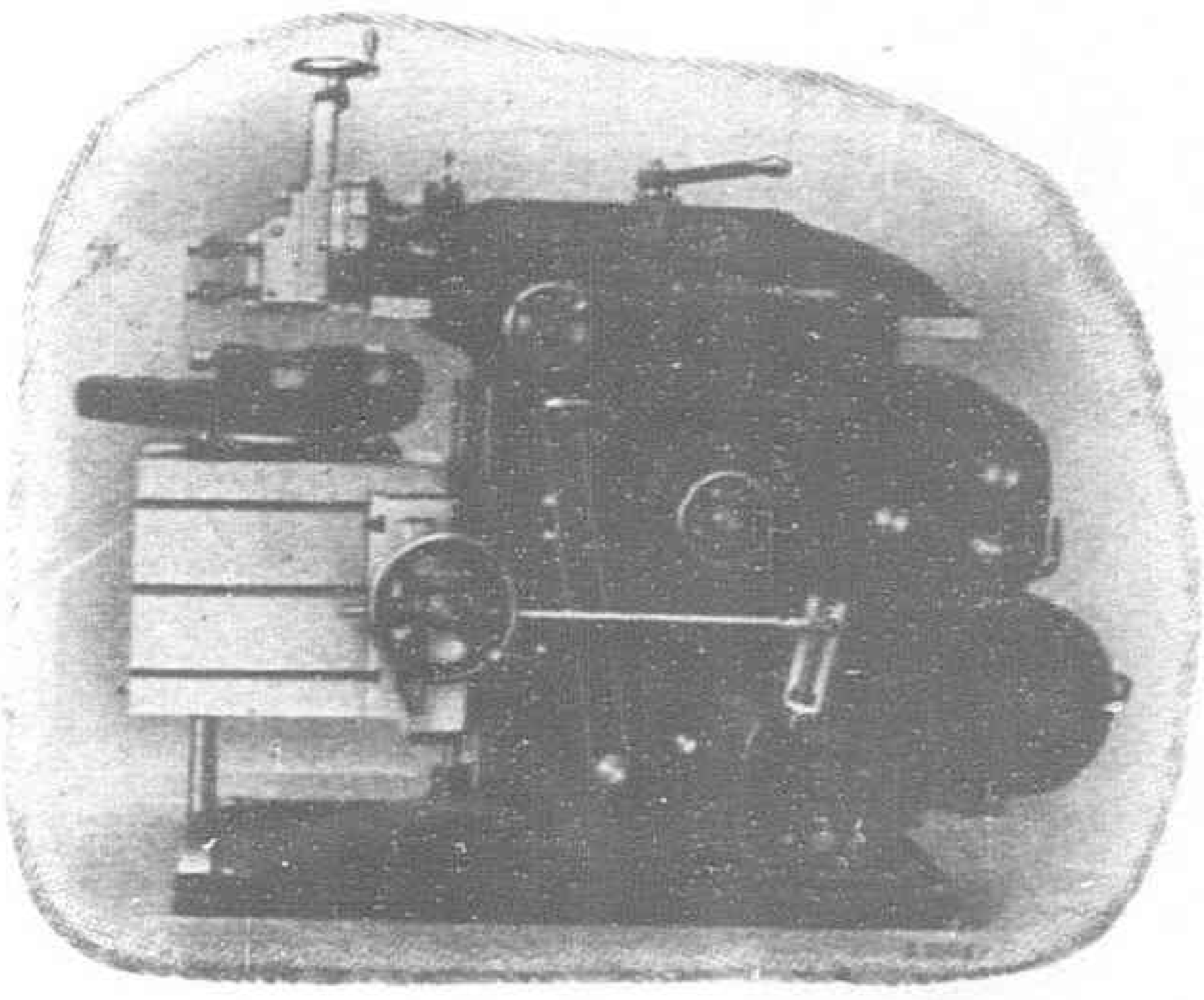
thus warranting first class make, favourable prices, stock supply

⁂

Established 1877



TURRET LATHES
7 Models
For bar work 7/16″—2 3/8″,
and chuck work up to 15″



HIGH SPEED SHAPERS
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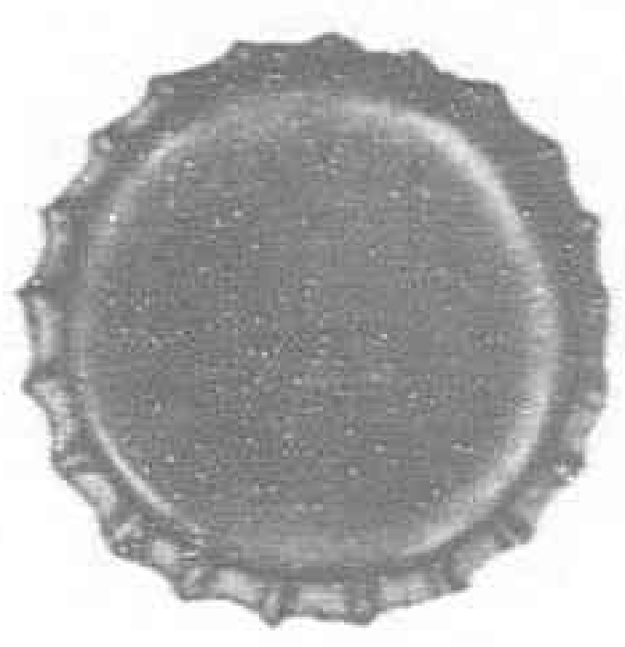
From 7 7/8″ up to 22″
stroke of ram



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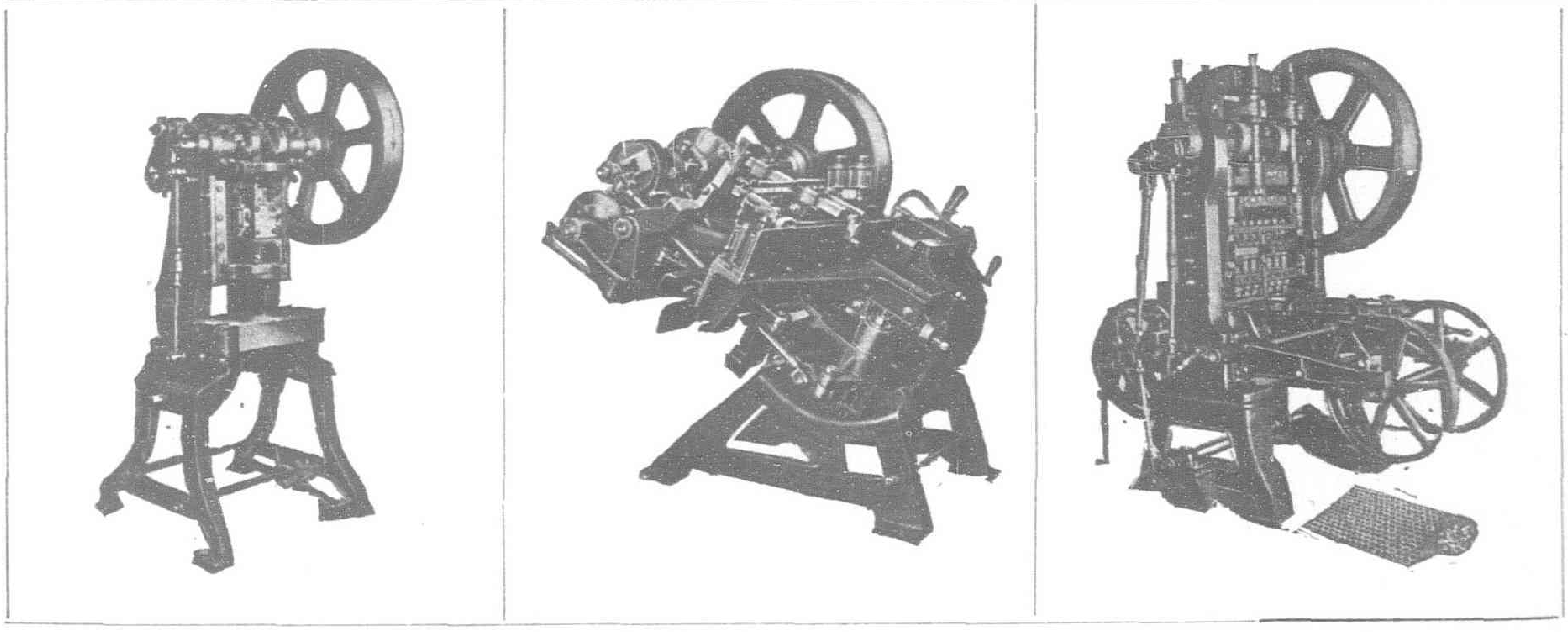
From left to right, the Presses illustrated below will give the following productions per eight hour day:
10,000—100,000 and 500,000 respectively.

Send us Samples and state daily production required and we will be glad to give you prices and full particulars



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Presses, Dies and Machinery for the Sheet Metal Industry in general. Complete plants for the manufacture of Metal Boxes, Sanitary Cans of all shapes and sizes, Kitchen Utensils, Petroleum Cans, etc. Complete automatic equipment for making tin cans from tin plate in one continuous operation.

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SHEWAN, TOMES & CO.,
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EMERALD BRAND
GREEN ISLAND CEMENT CO. (LIMITED)

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Green Island Cement is supplied in Bags = 250-lbs. net, Casks = 375-lbs. net, Iron Drums = 375-lbs. net.

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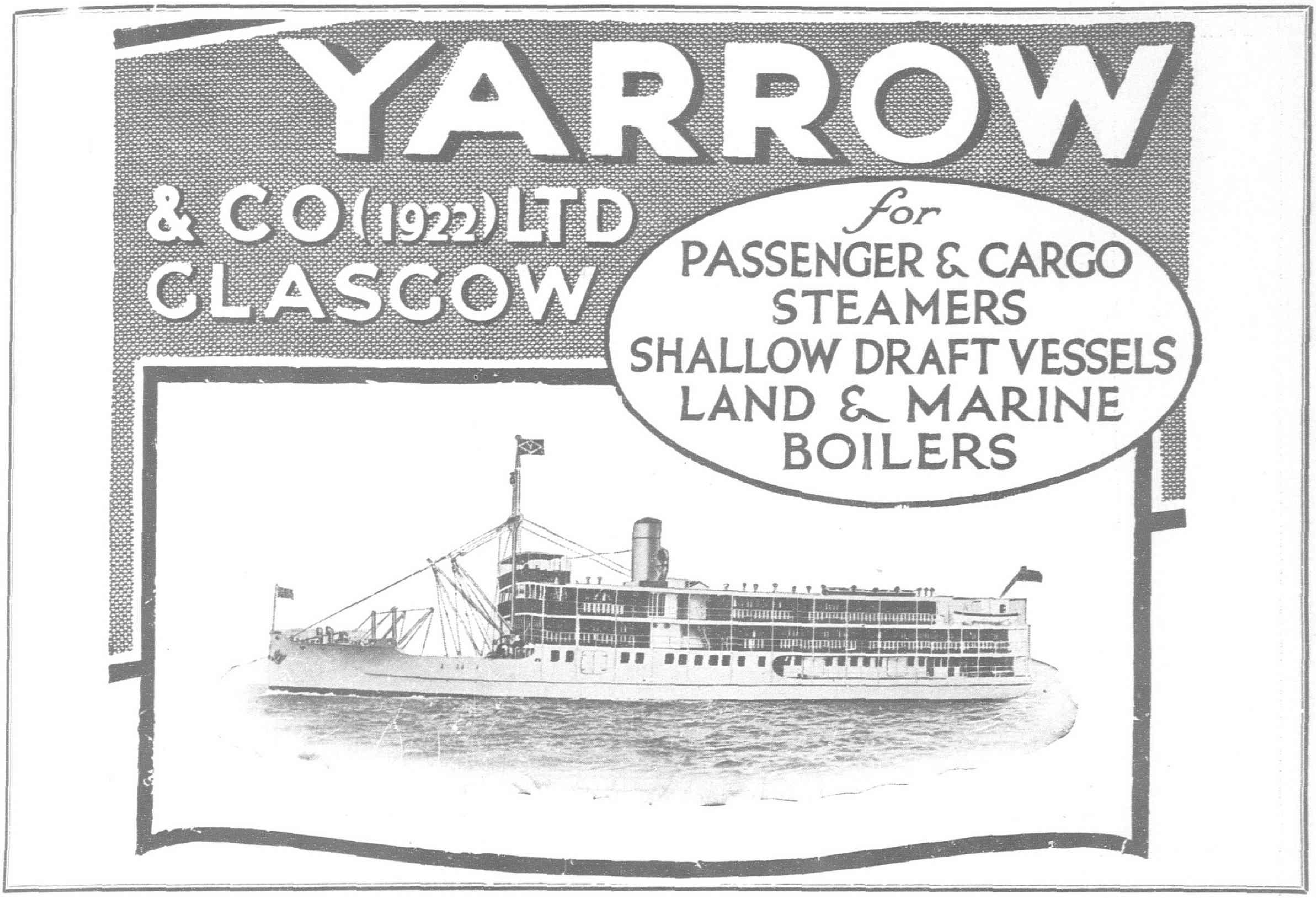
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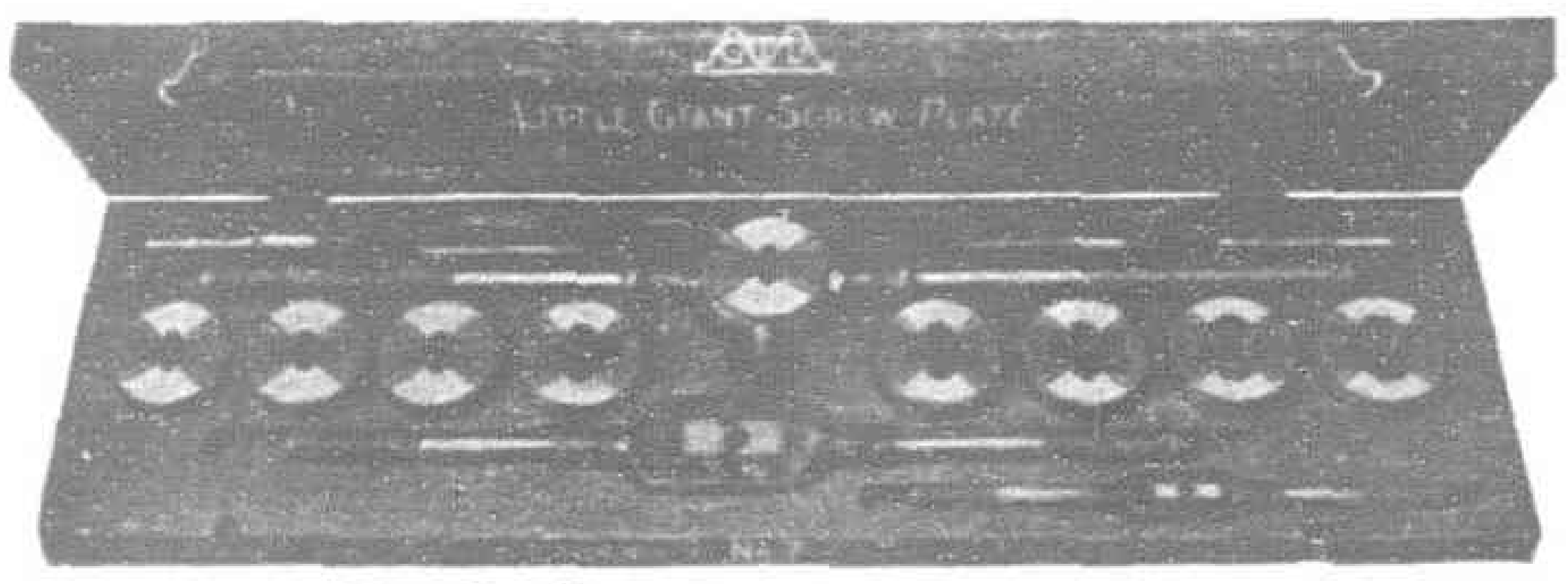
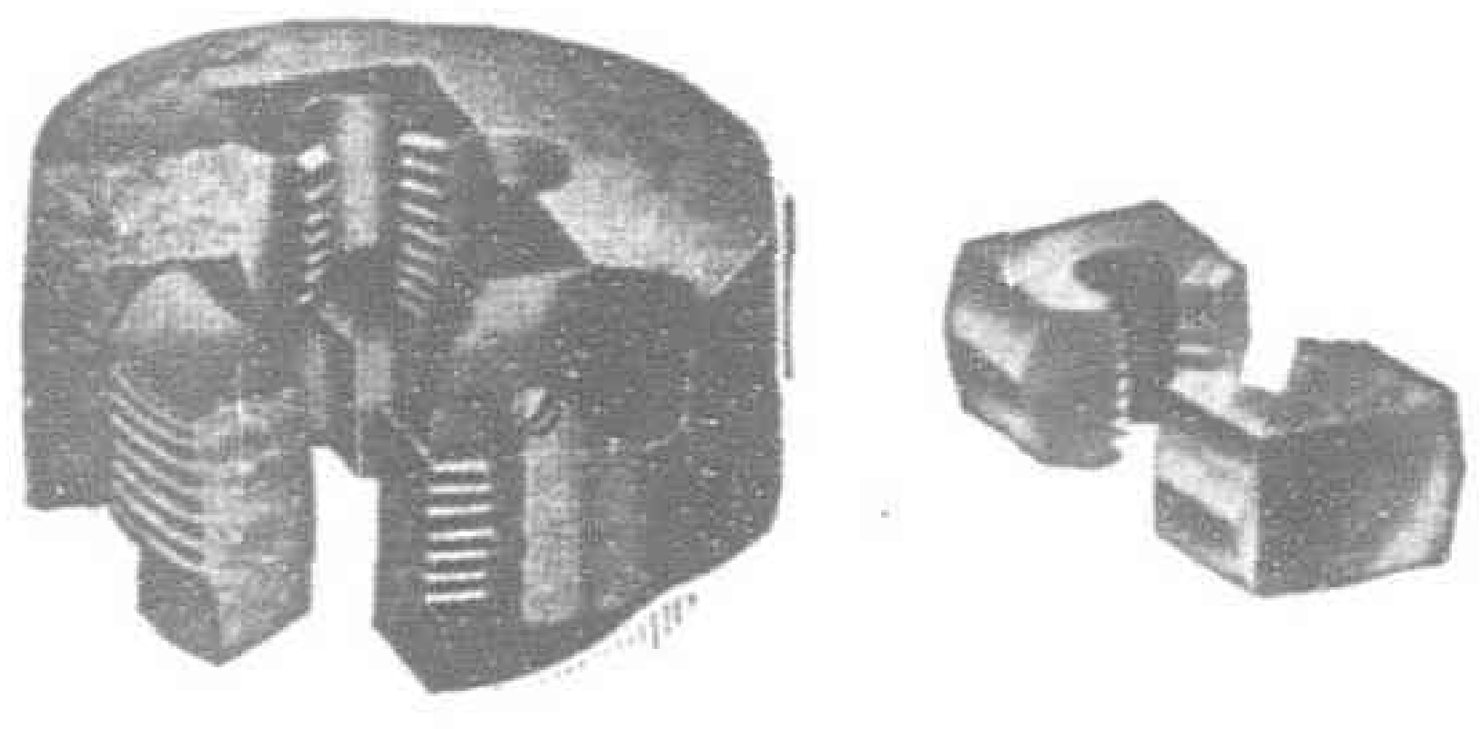
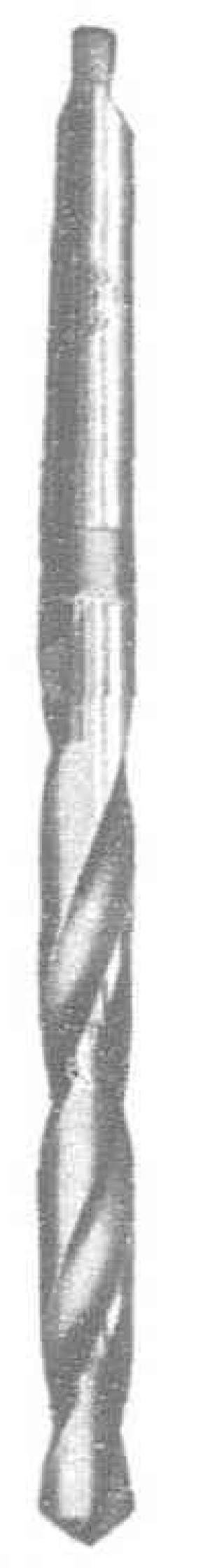
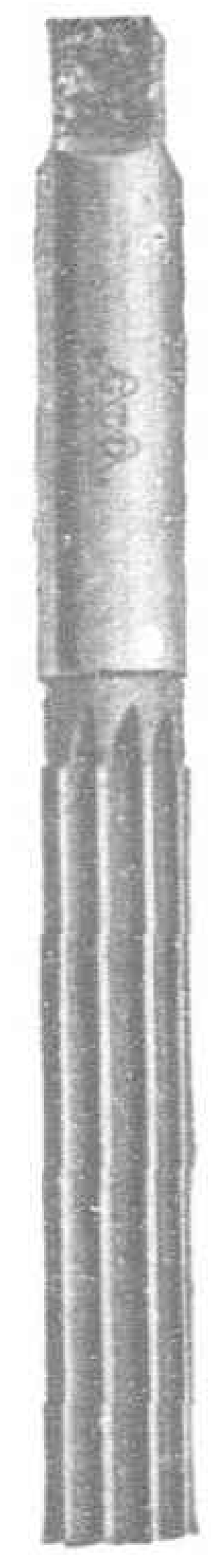

Little Giant Screw Plate


Little Giant Collet and Die

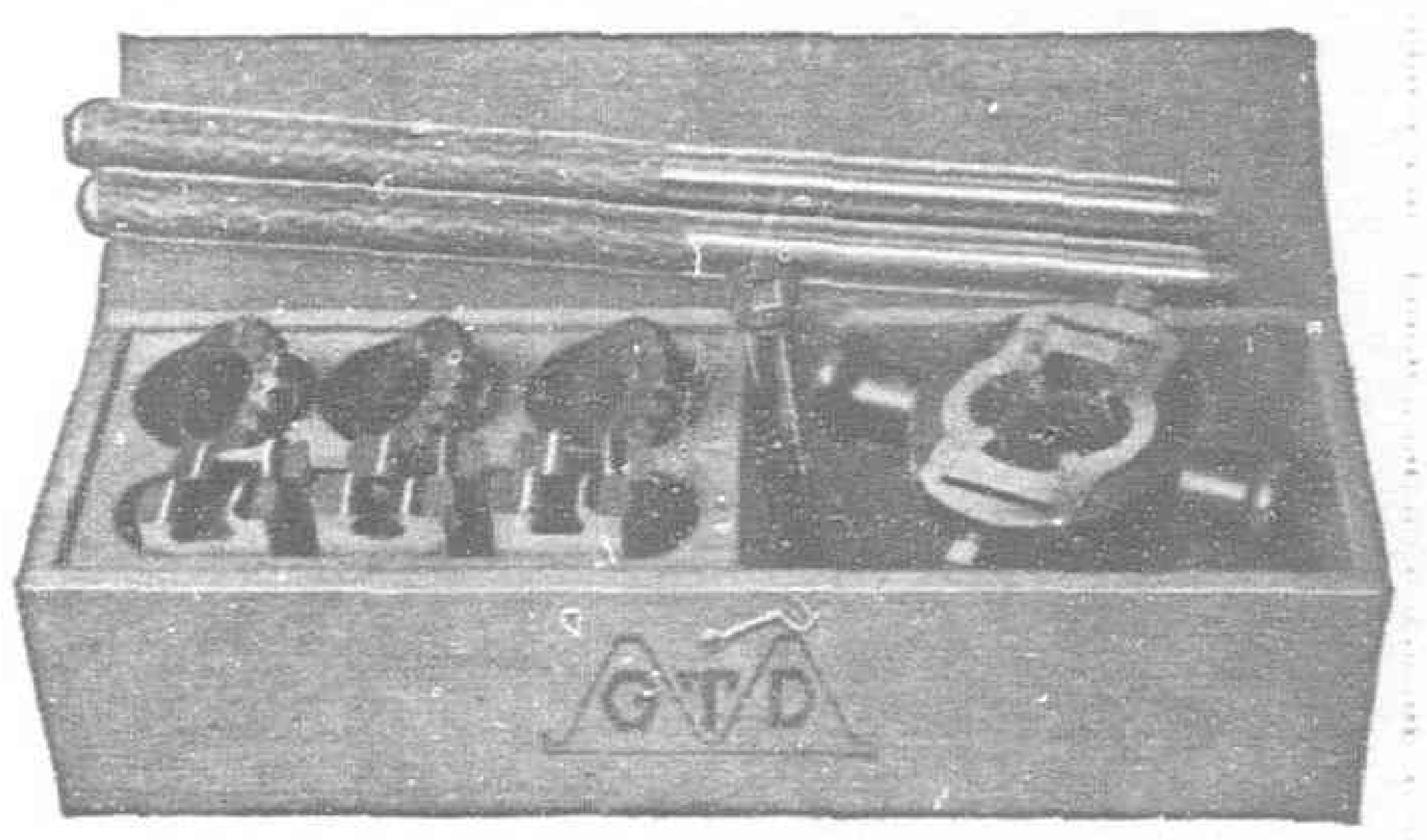
Tap


Drill


Reamer

GTD GTD GTD

FOR FAR
EASTERN MERCHANTS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GTD experience in handling foreign orders has extended over 50 years. Last year GTD products were sent to 63 countries. It is readily apparent that we are well able to serve the overseas merchant.

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MULLER, PHIPPS & SELLERS, LTD.
Dojima Building, Osaka (Central P. O. Box 63)

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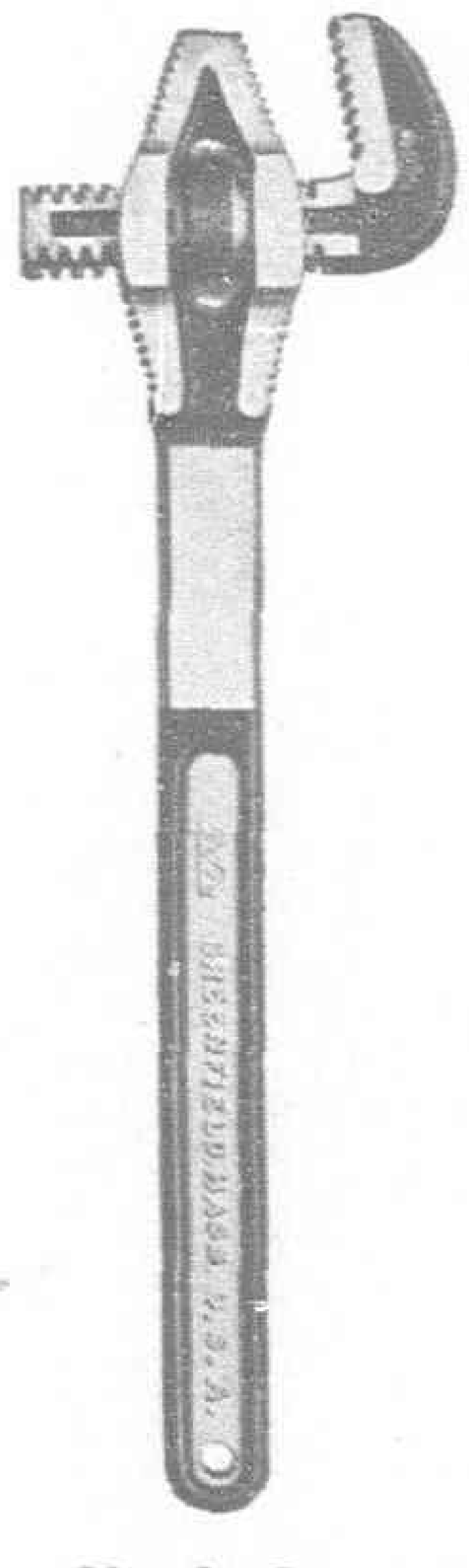
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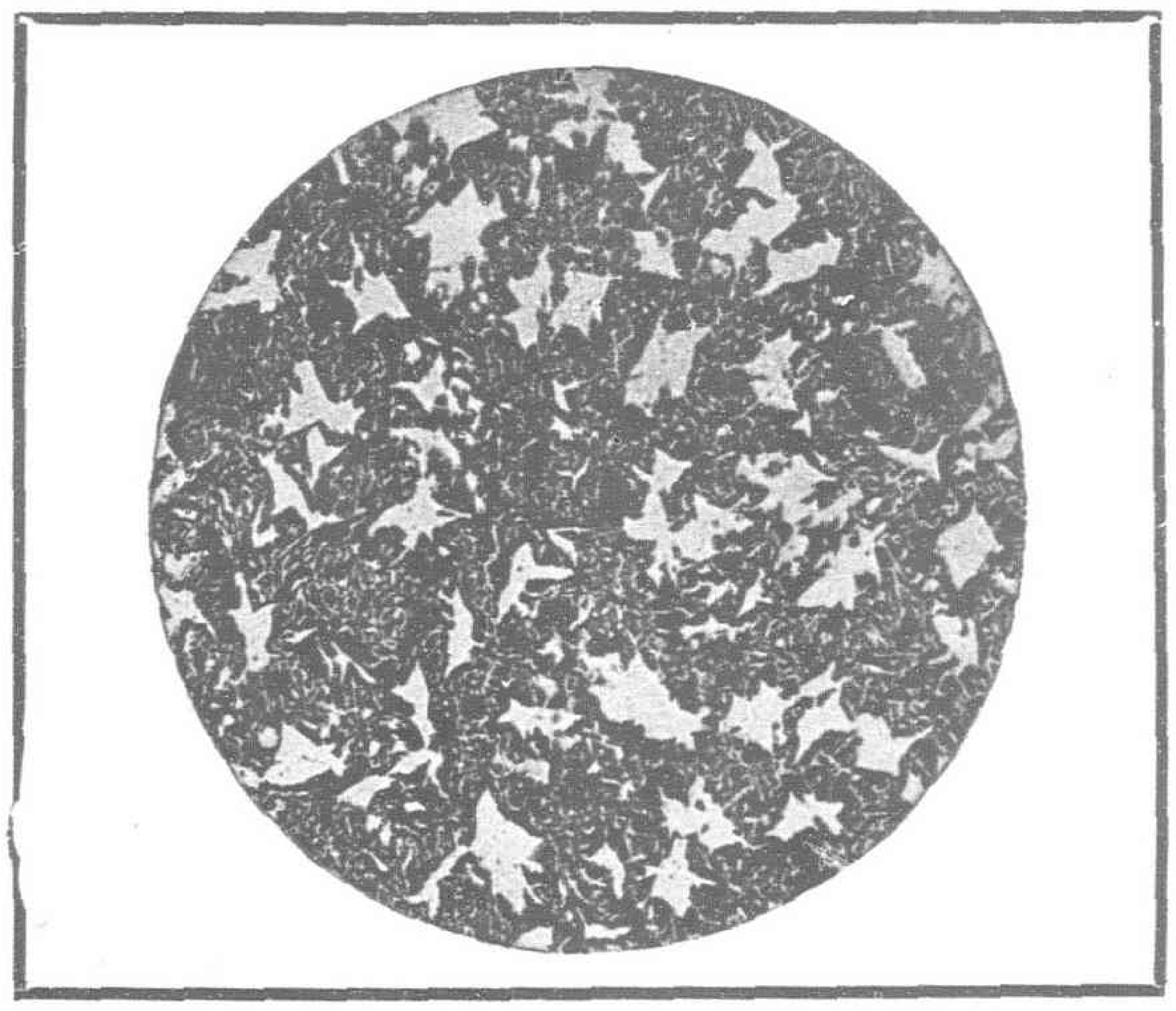
NOTE THE CHARACTERISTIC STRUCTURE WHICH IS UNIFORM THROUGHOUT THE WHOLE OF THE ALLOY



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OF

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Mexico City, Mexico
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Billets
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Bolts and Nuts
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Cars—Steam Railway, Mine and Industrial Railway Cars
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Car Wheels
Channels
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Nail Rods
Nail Wire
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Skelp
Slabs
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Towers—Steel
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No. 14 Canton Road, Shanghai

President:
Baron K. Okura

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Cotton, Wool, and their Manufactures
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INSURANCE AGENTS

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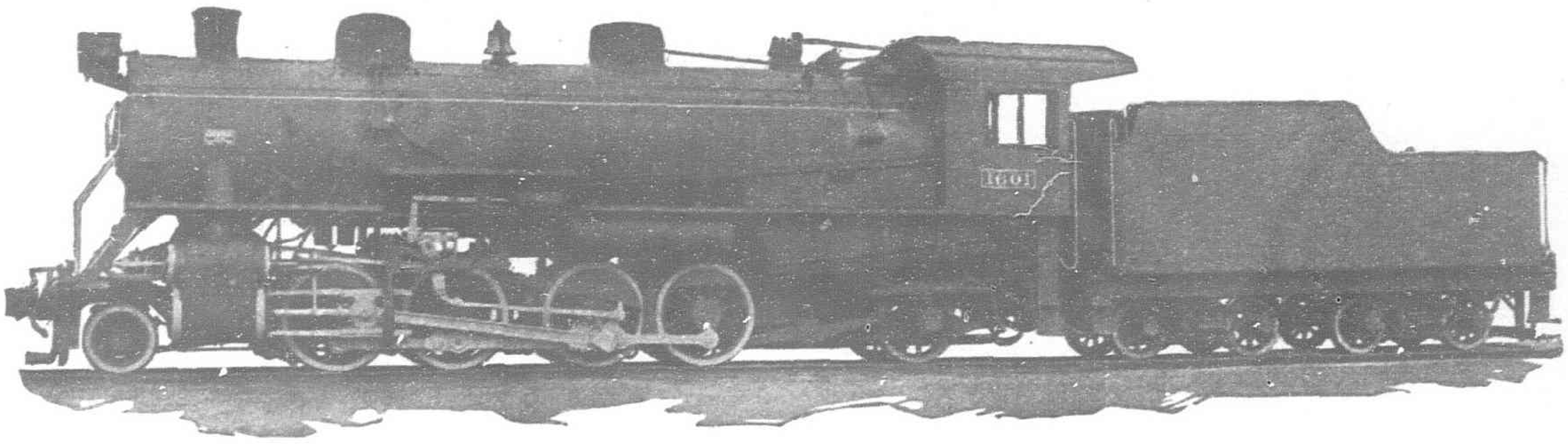

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Weight on Driving Wheels, 194,000 pounds ; Weight of Engine, 263,500 pounds ; Three Cylinders, 22½ × 26 inches ; Diameter of Driving Wheels, 54 inches ; Boiler Pressure, 180 pounds ; Maximum Tractive Power, 56,000 pounds.

THREE CYLINDER LOCOMOTIVE

A more uniform turning movement permitting greater tractive power per pound of weight on drivers.

Reduction in piston thrust due to smaller size of piston used.

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Increased tonnage per pound of weight on drivers.

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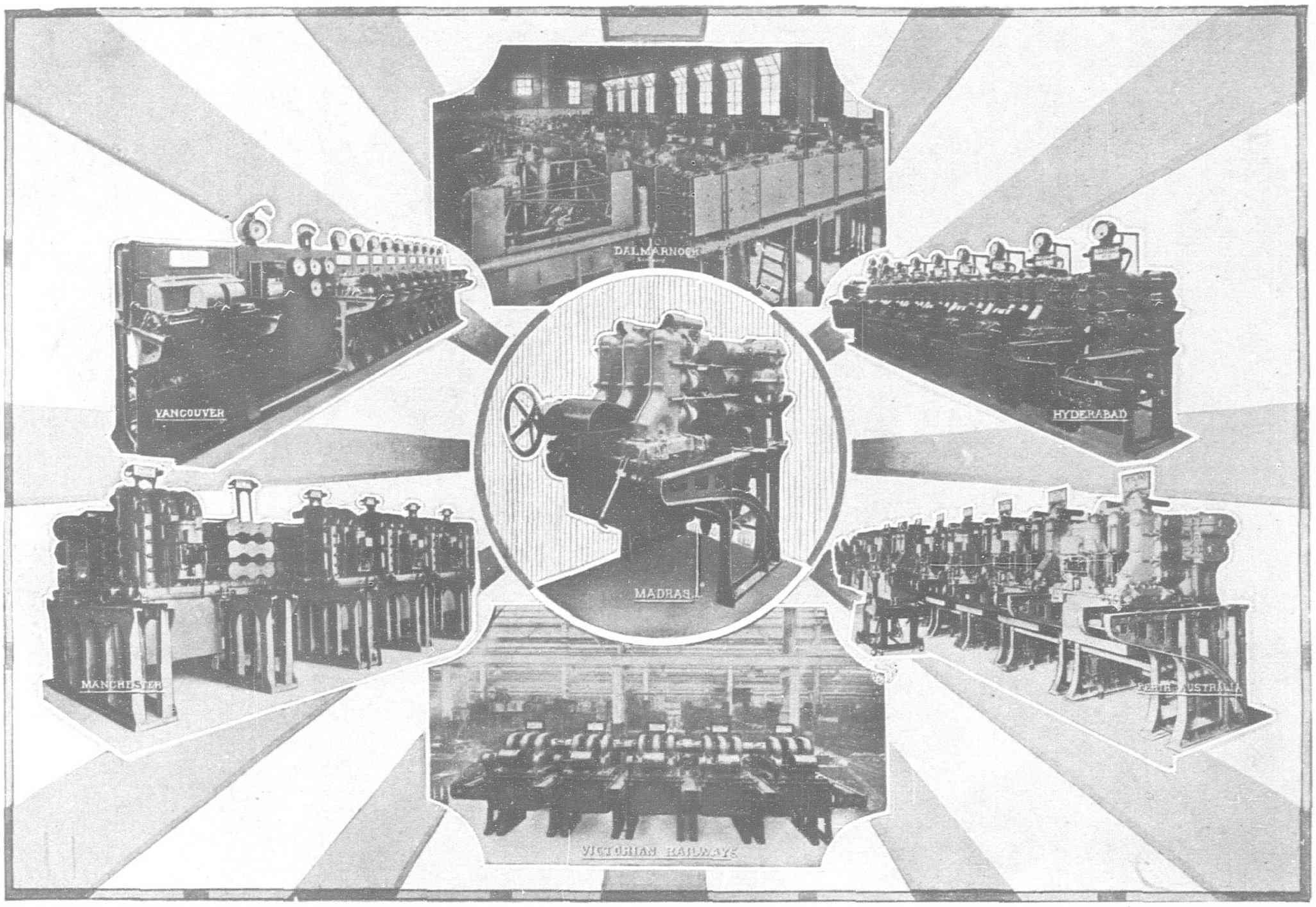

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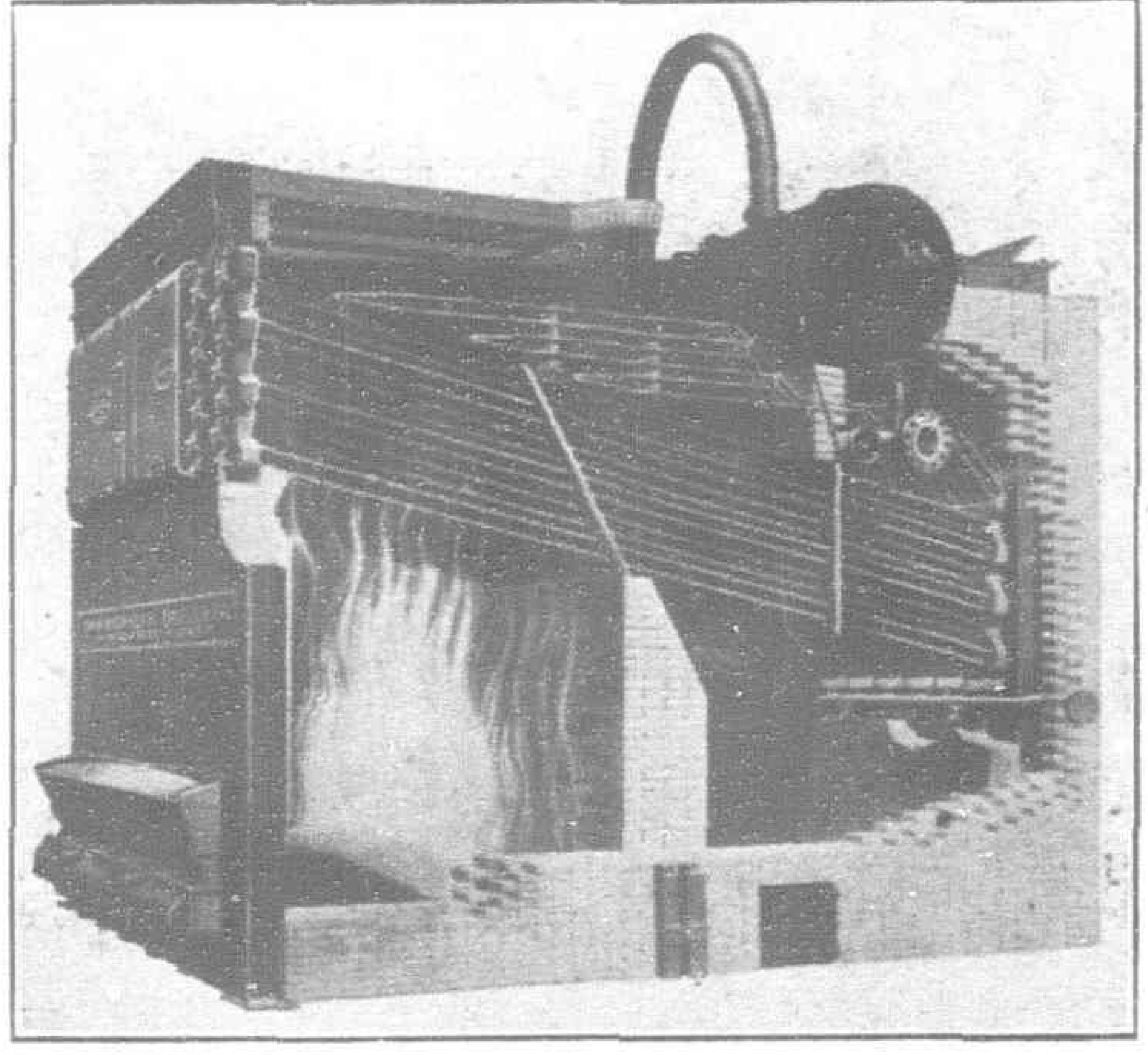

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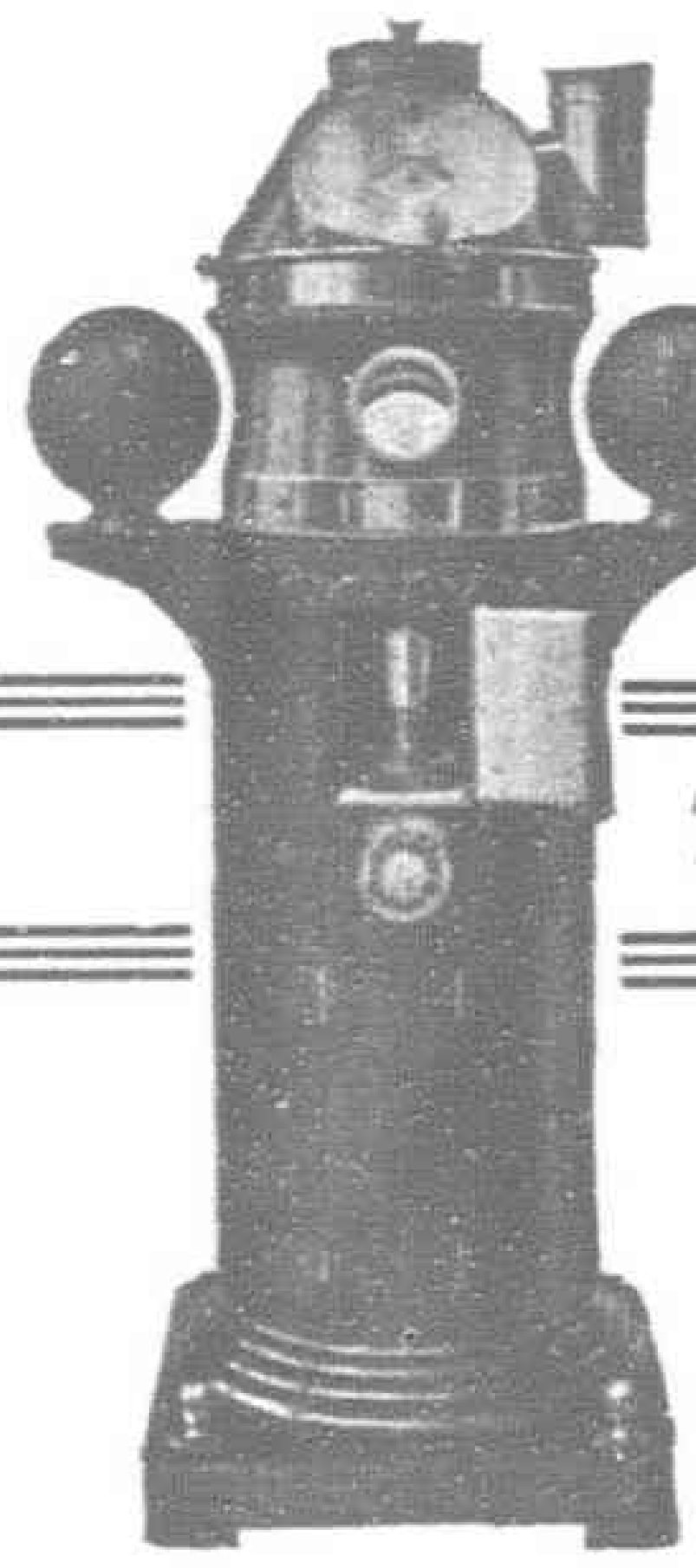

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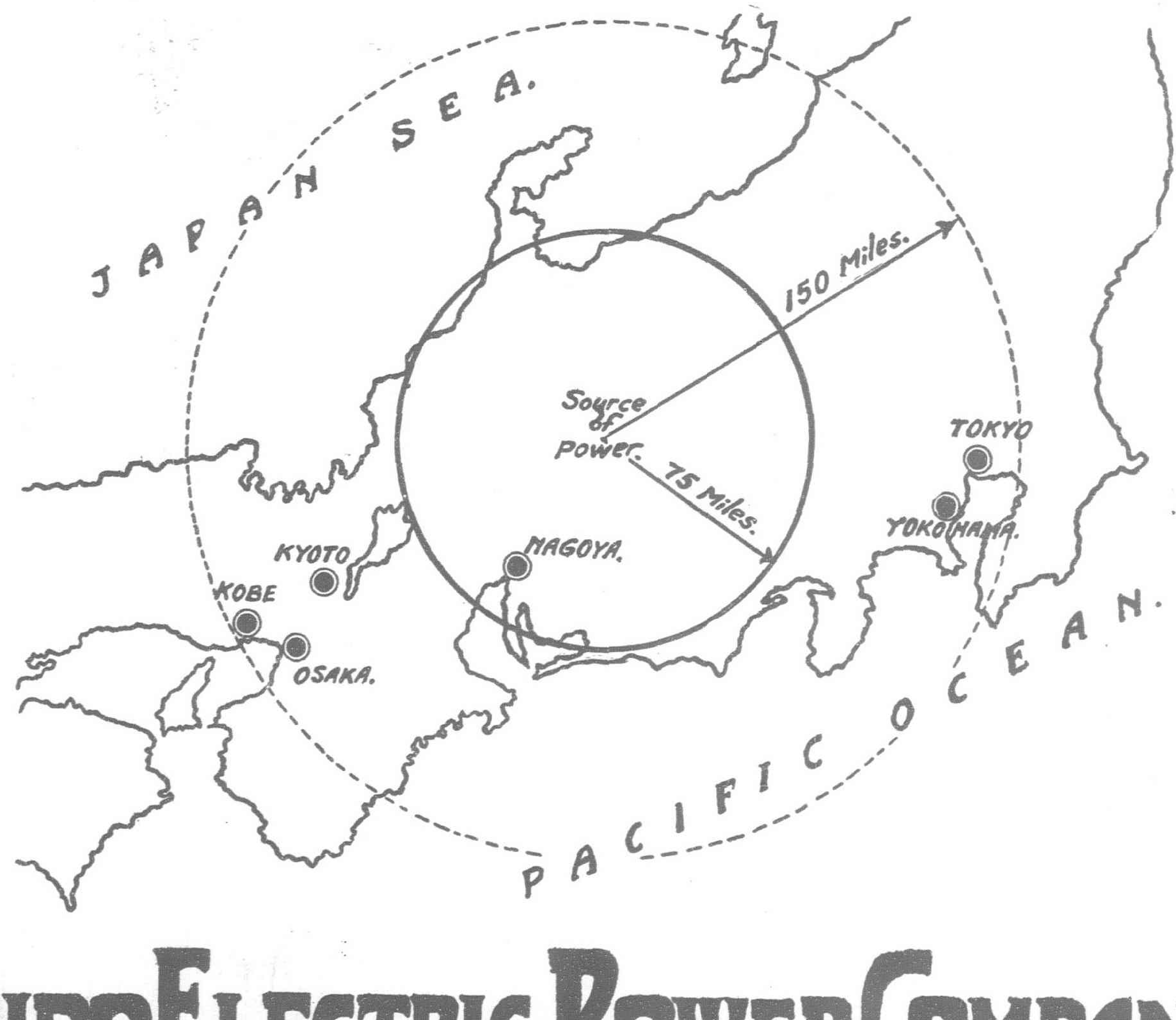
UNIFICATION
OF
HYDRO-ELECTRIC DEVELOPMENT
IN
CENTRAL JAPAN



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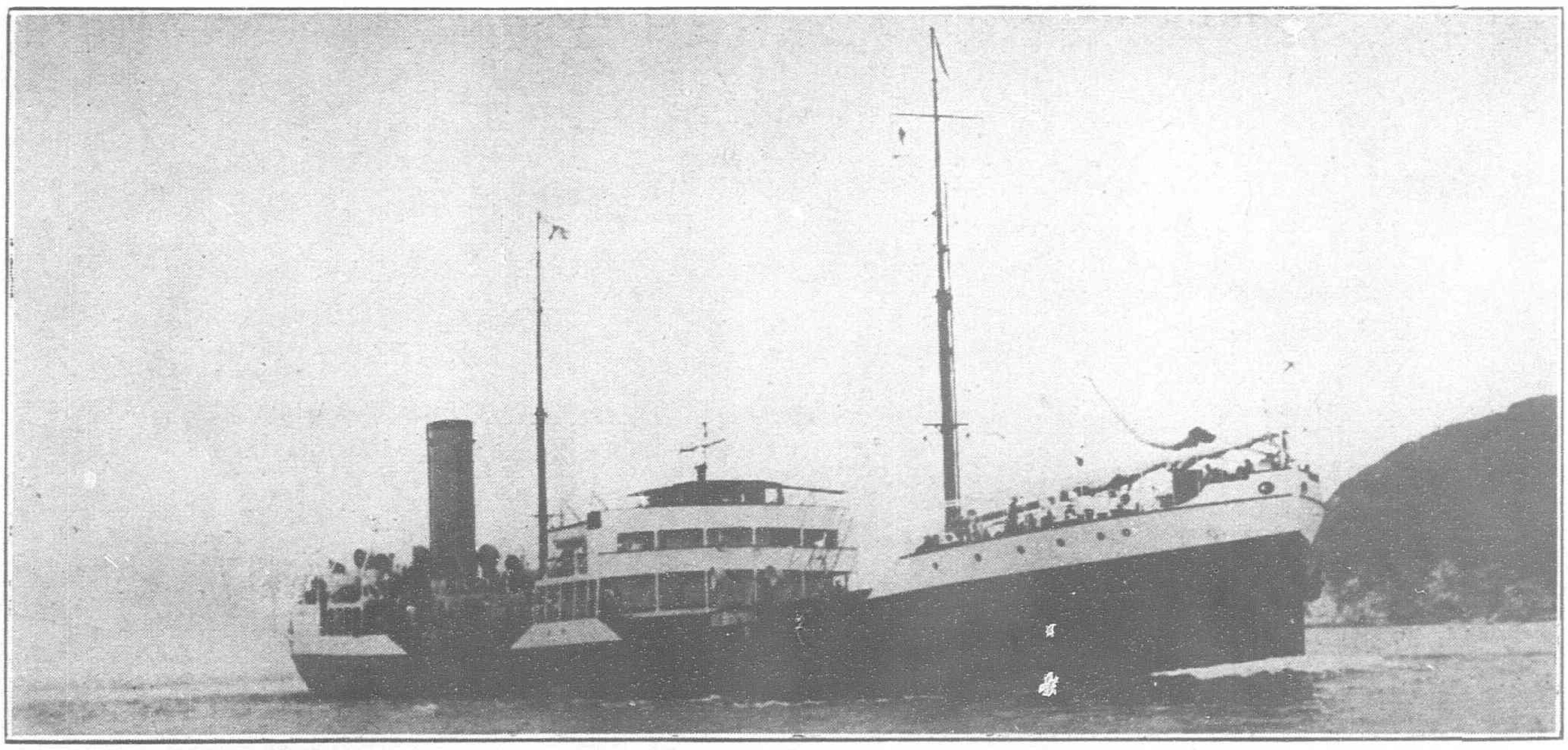

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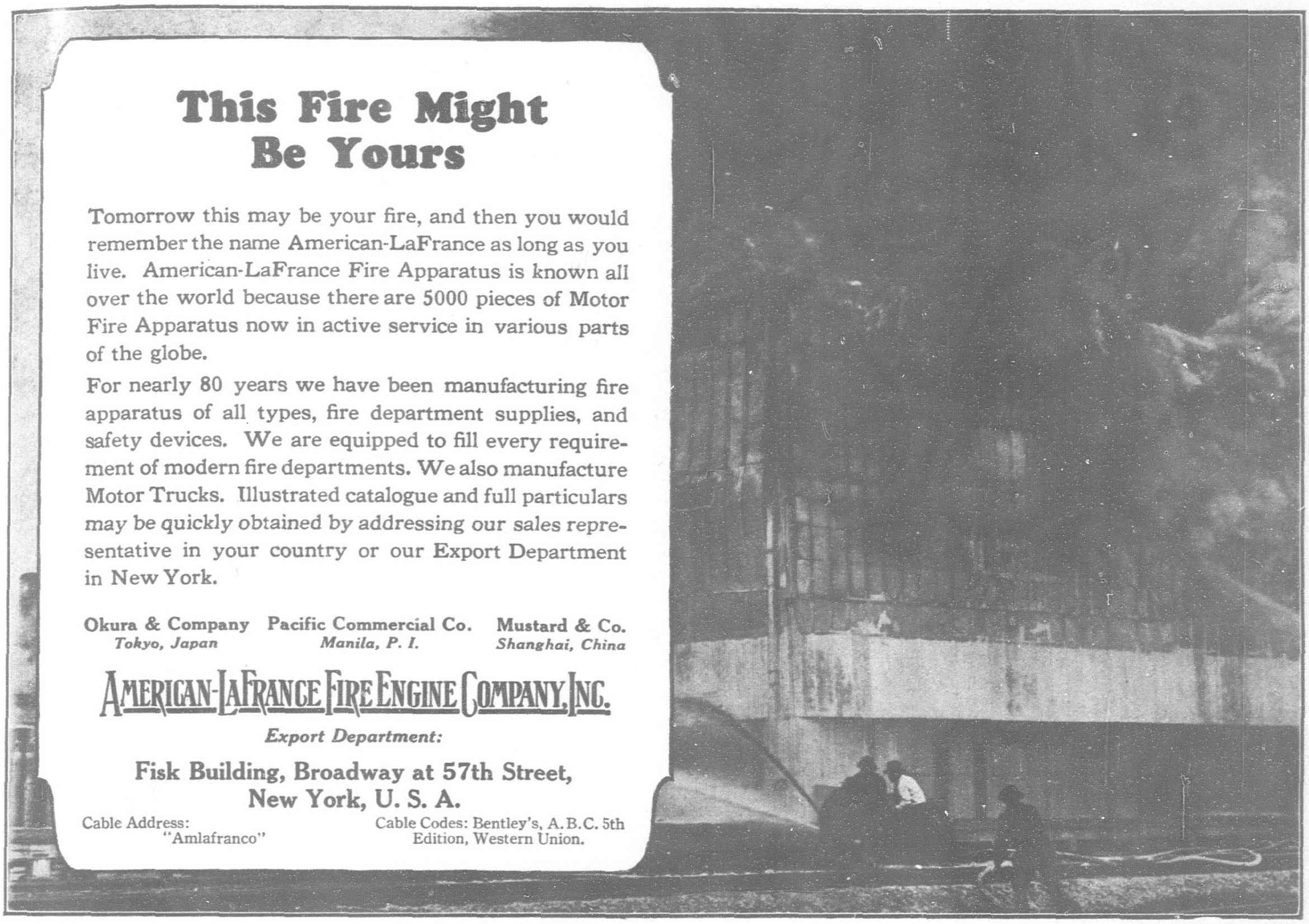

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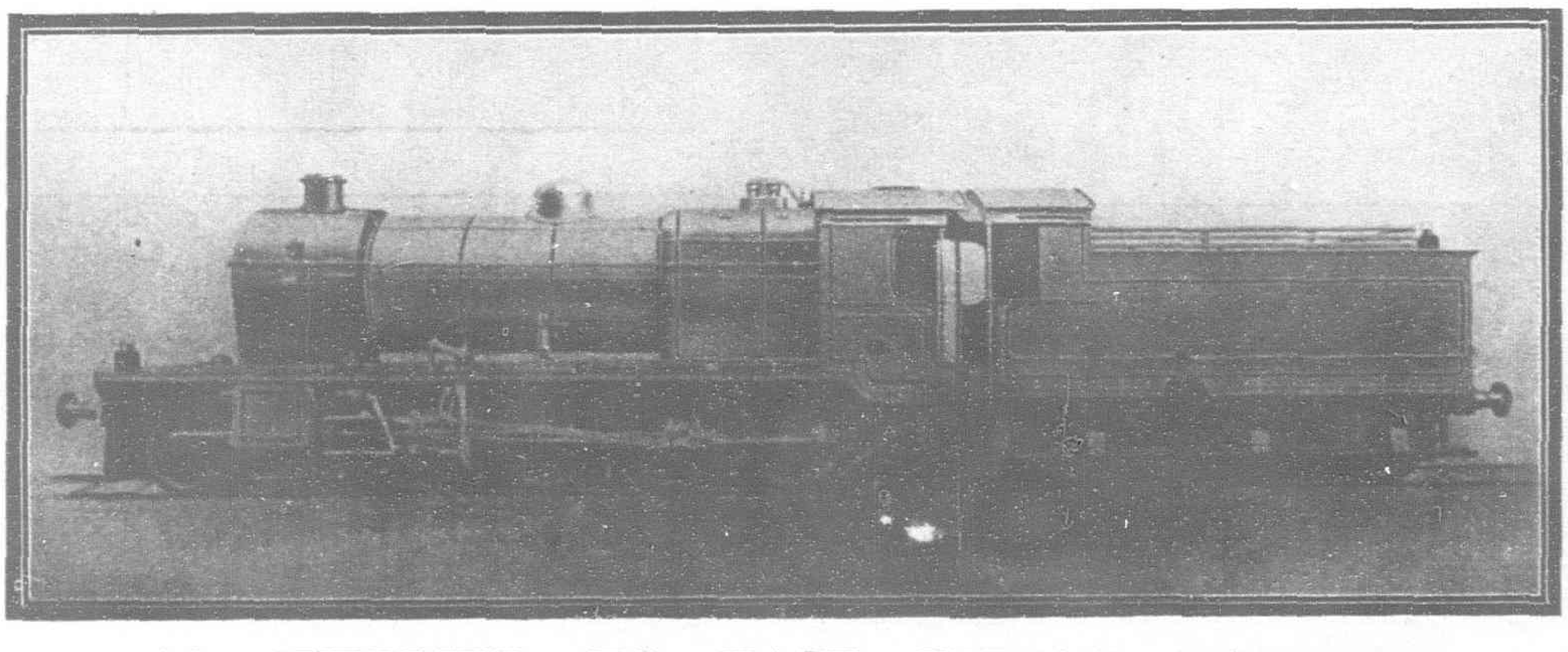

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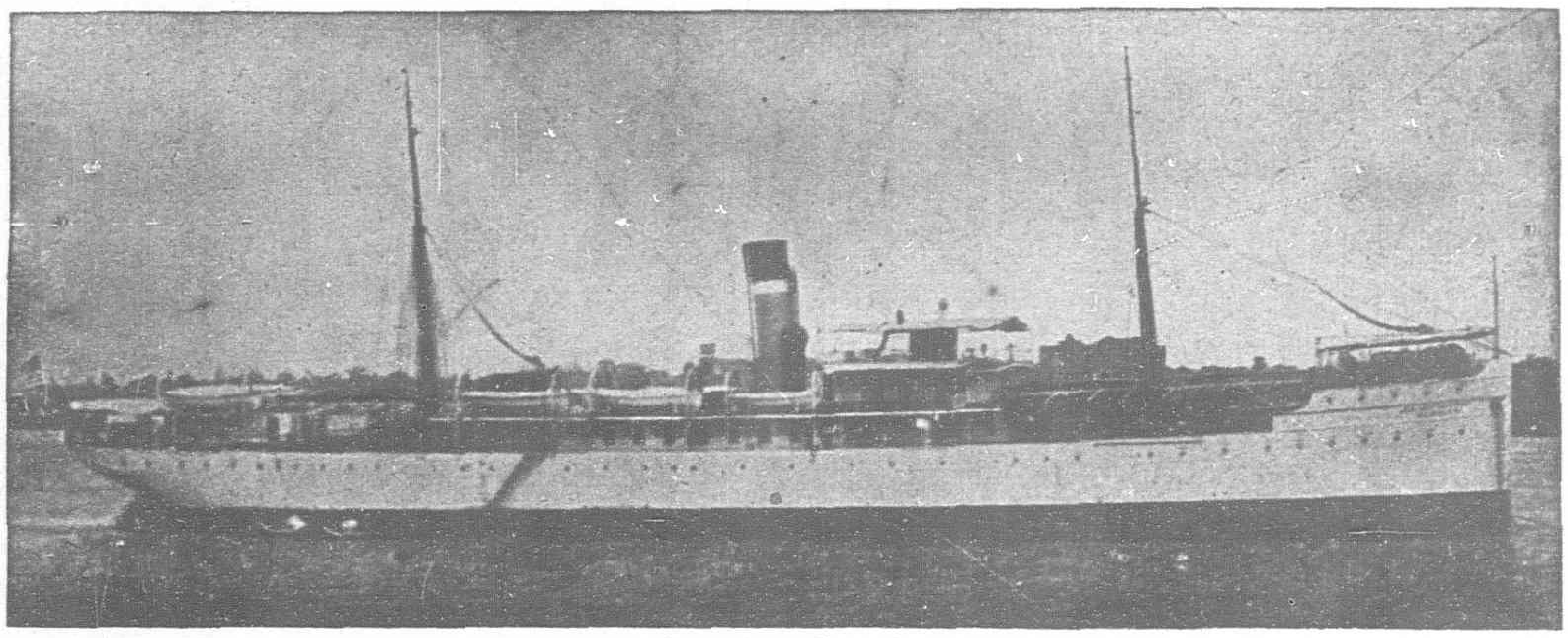

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Codes Used,
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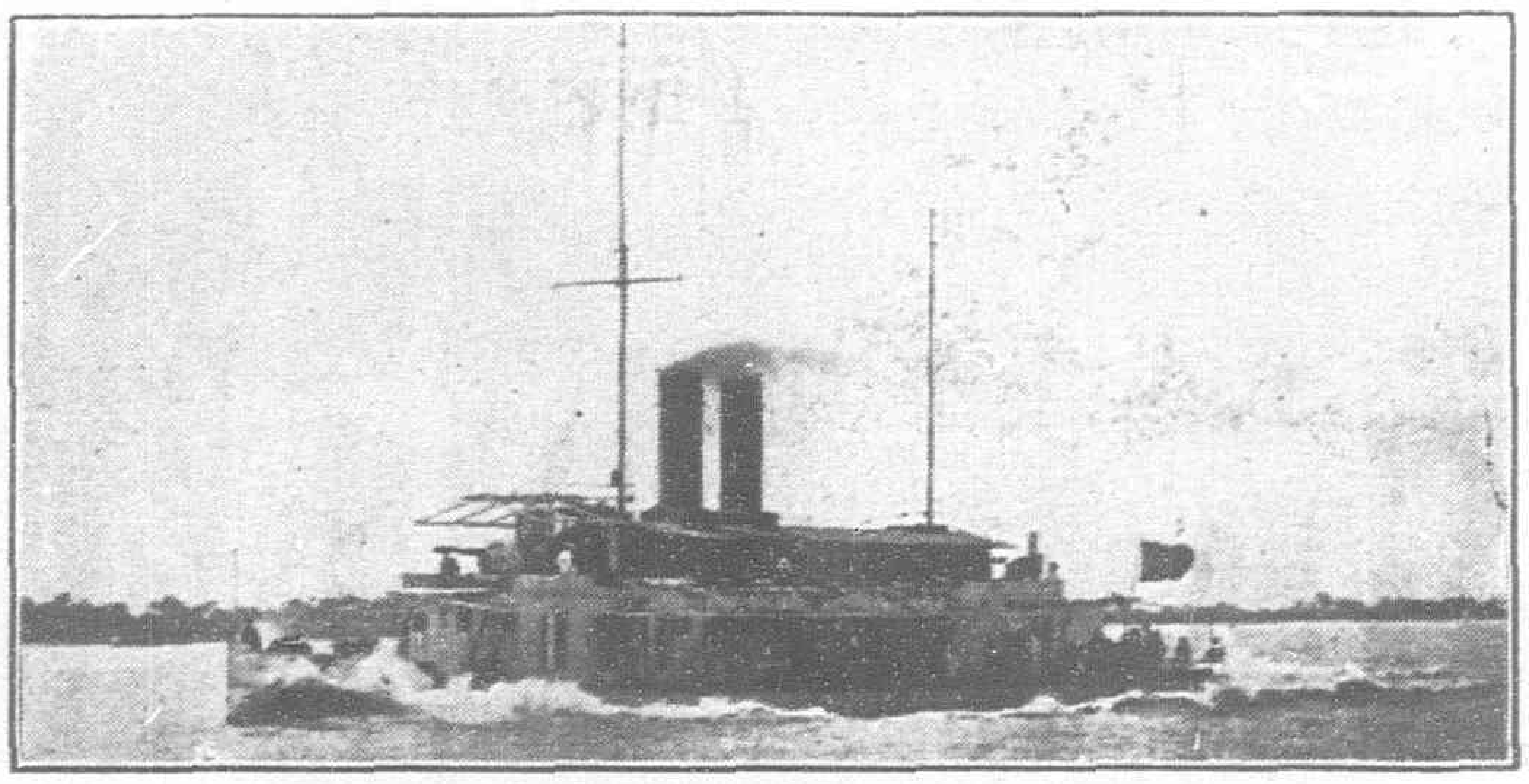
International Dock ...	528 ,,	77 ,,	23 ,,
Old Dock	399 ,,	53 ,,	16 ,,
Tunkadoo Dock ...	350 ,,	67 ,,	16 ,,



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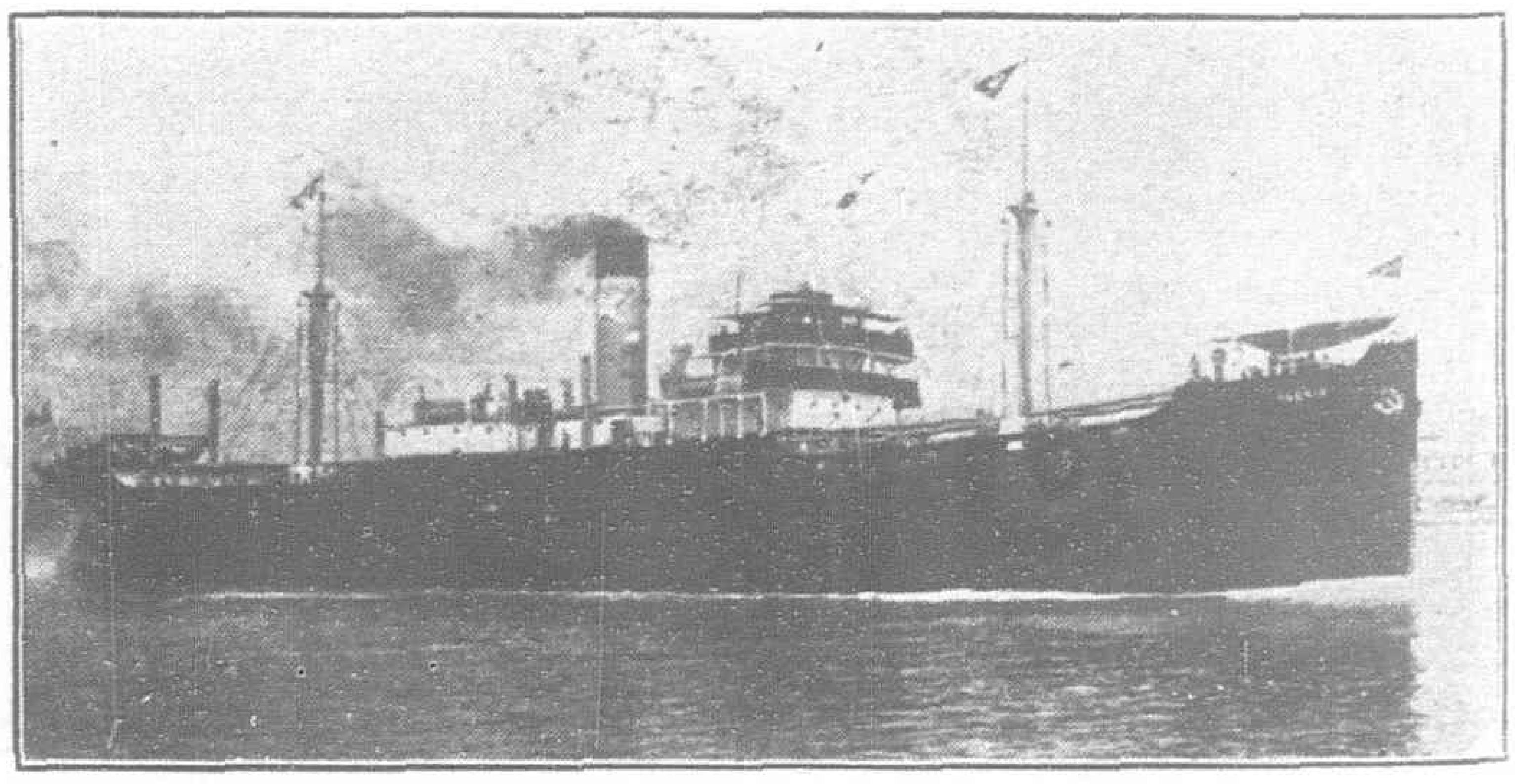

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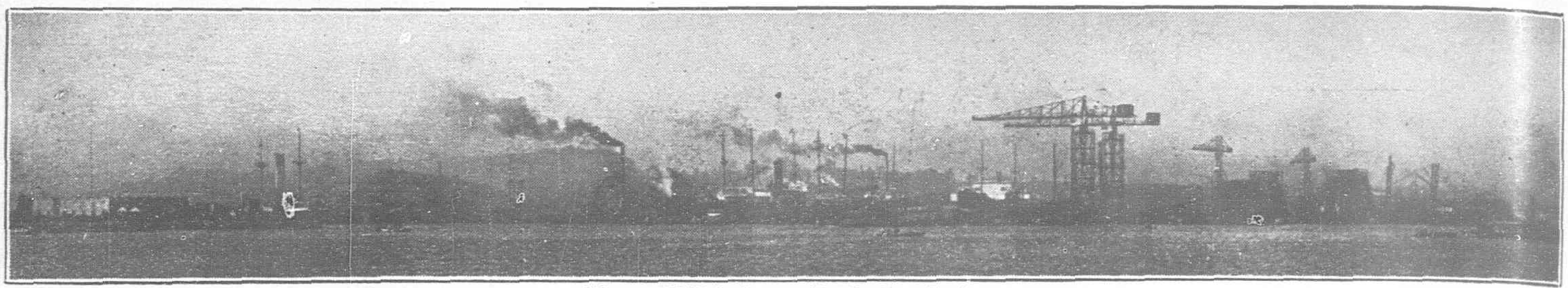

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Code Used:
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No. 2	380′ × 50′ × 26′
No. 3	480′ × 63′ × 21½′

SHIPBUILDING BERTHS:

No. 1	400′ × 27′
No. 2	490′ × 30′
No. 3	580′ × 36′
No. 4 No. 5	680′ × 38′

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Iron Building	8,871.57
Concrete Building	1,636.99
Brick Building	2,011.72
Others	5,807.74

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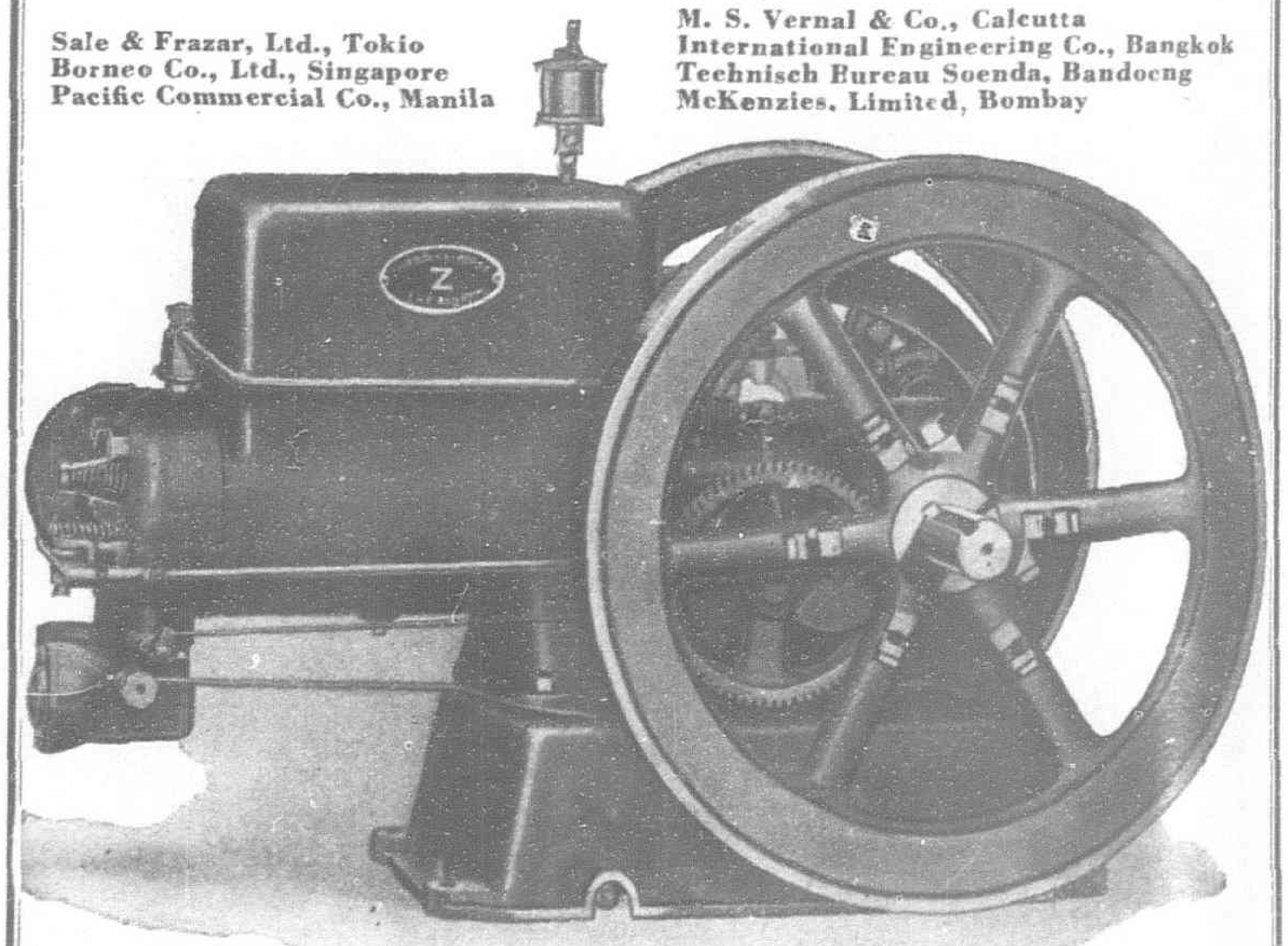

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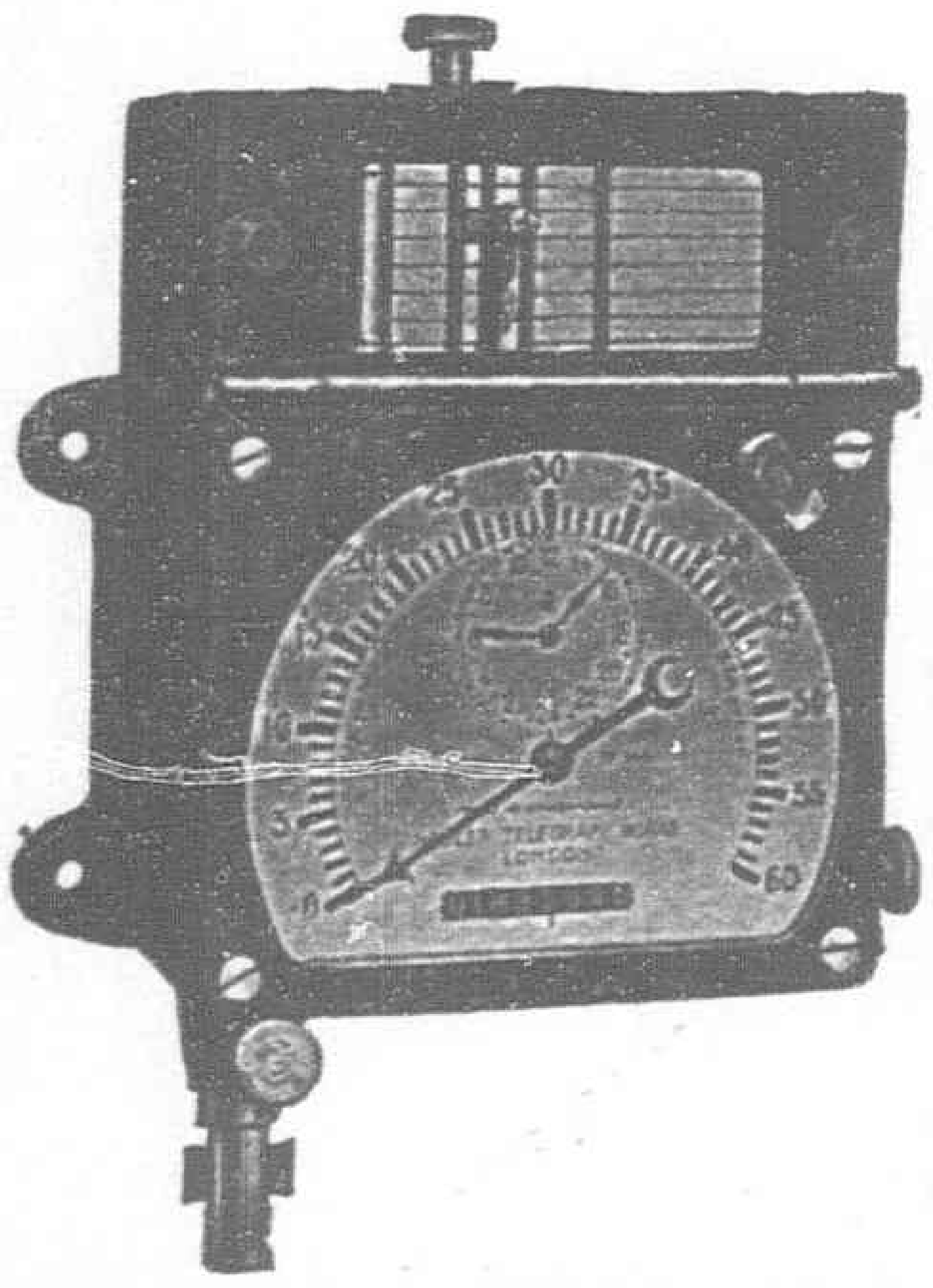

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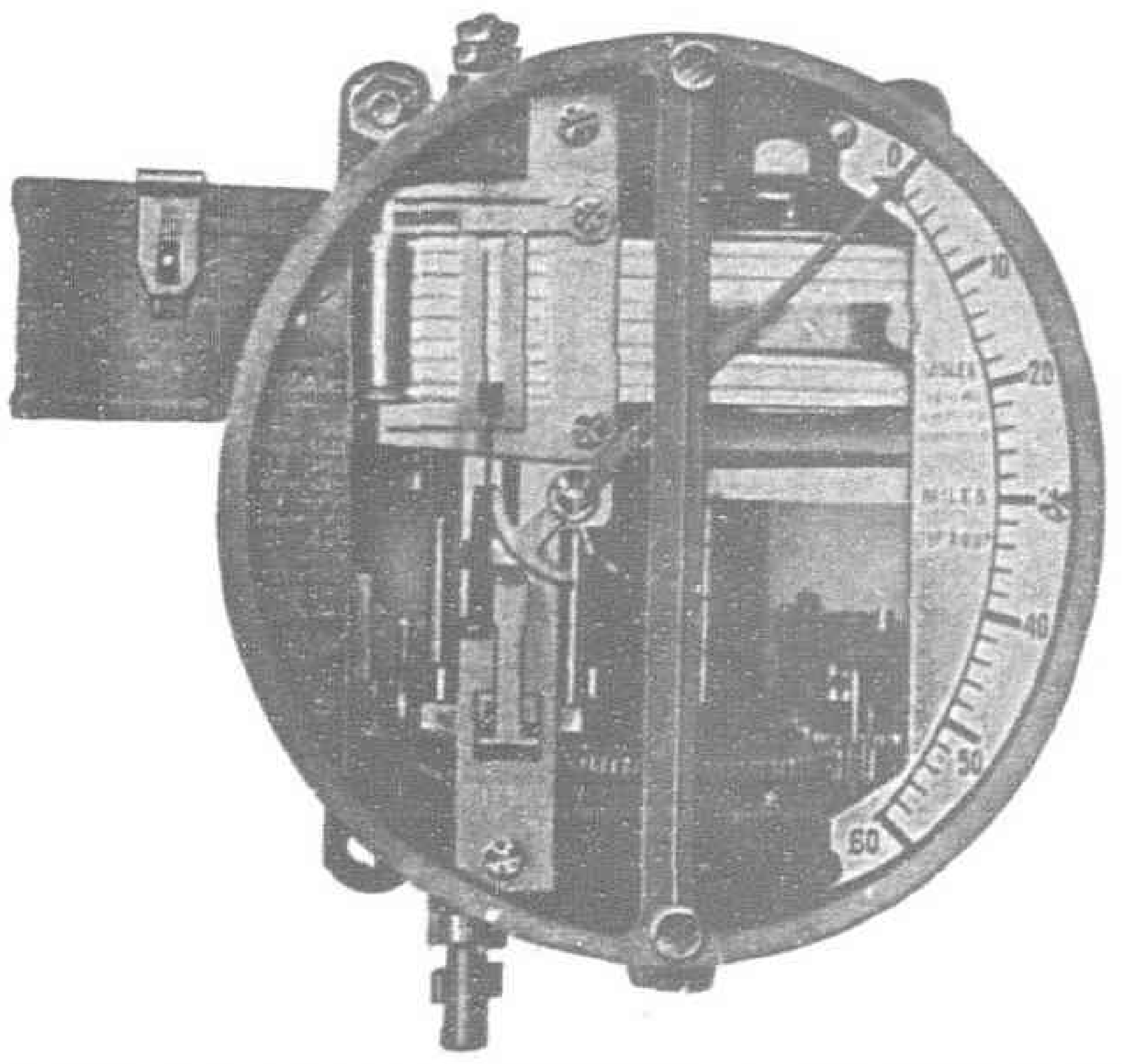

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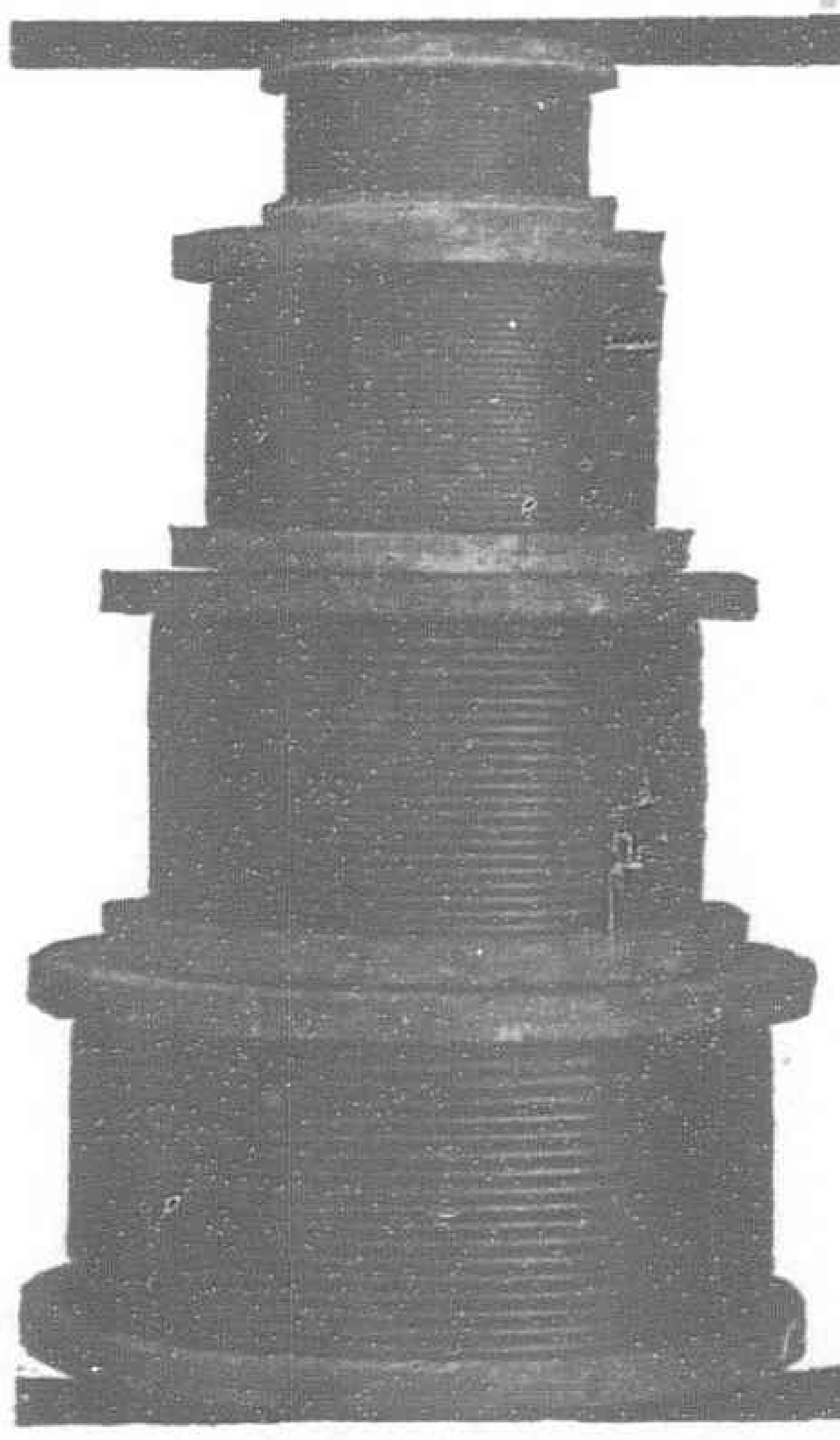

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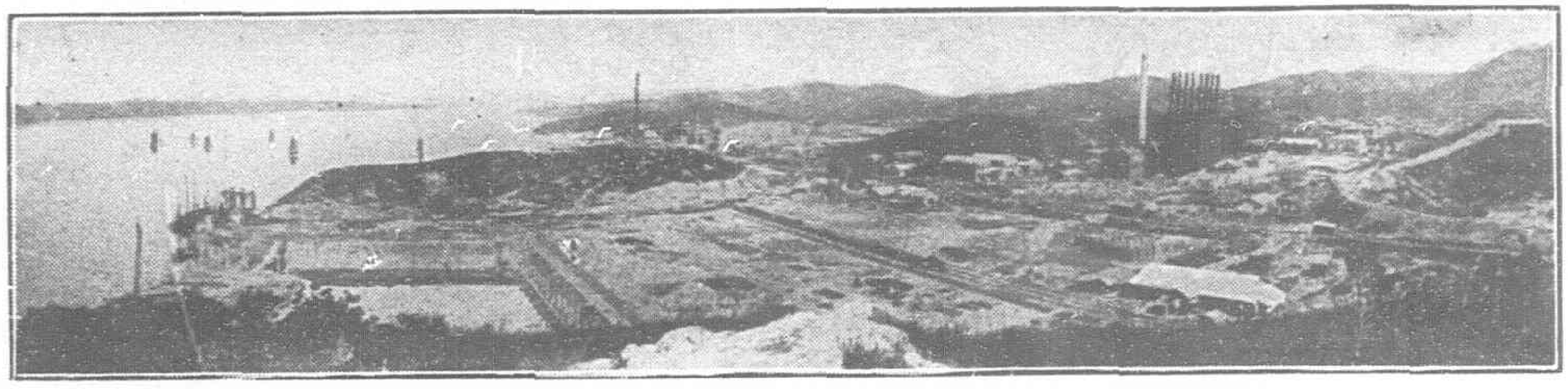

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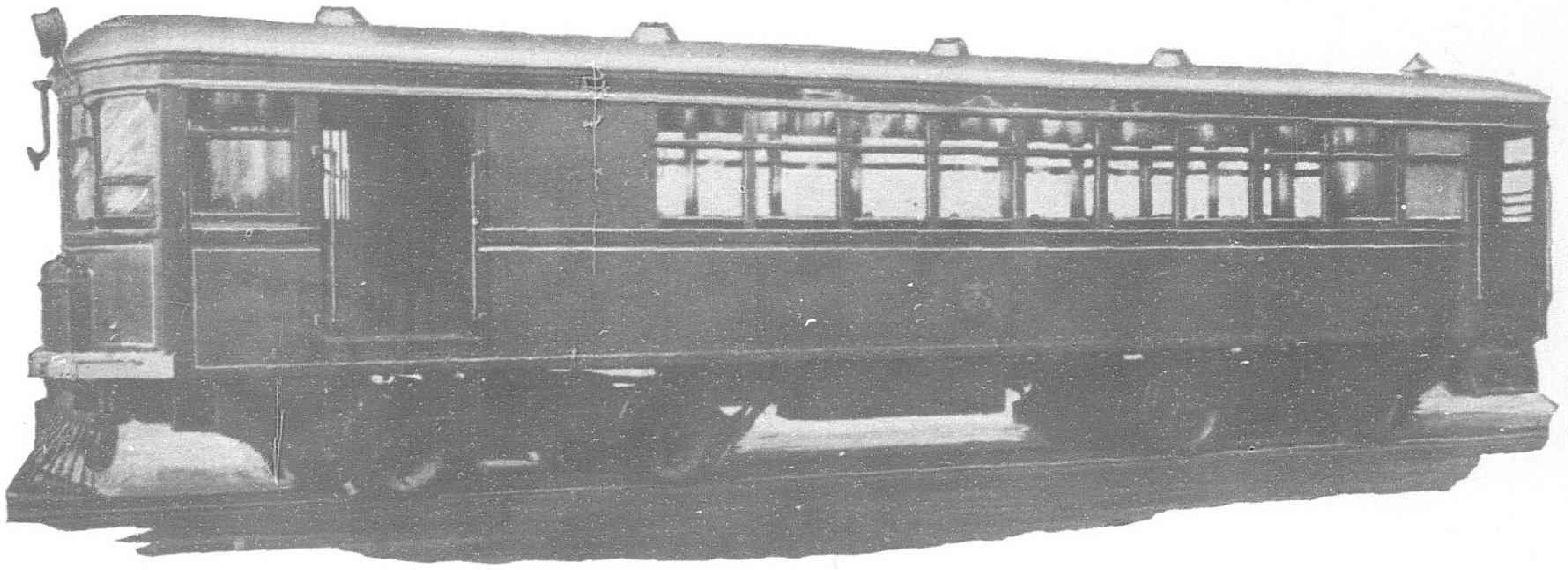

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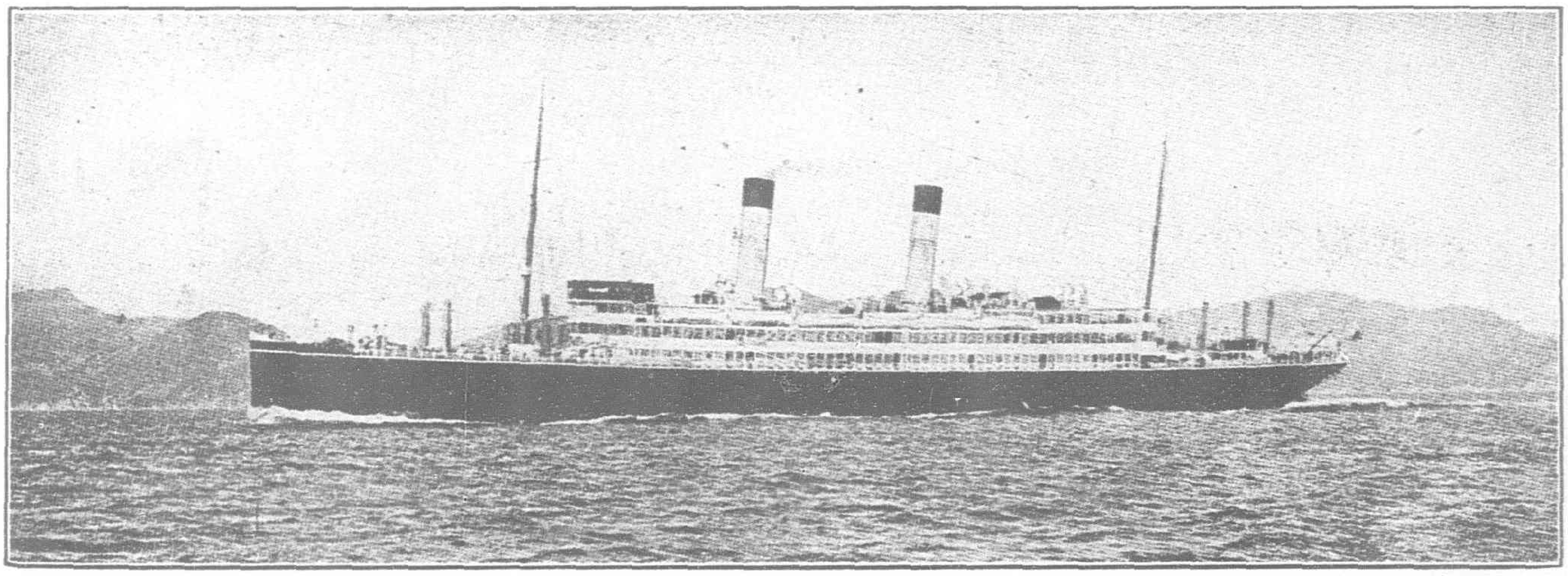

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Length on Blocks - - - - -	513	,,
Width of Entrance on Top - -	89	,,
,, ,, ,, ,, Bottom-	77	,,
Water on Blocks at Spring Tide	26½	,,

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Extreme Length - - - - - - -	371	Ft.
Length on Blocks - - - - - -	350	,,
Width of Entrance on Top - - -	66	,,
,, ,, ,, ,, Bottom -	53	,,
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Extreme Length - - - - - - -	728.9	Ft.
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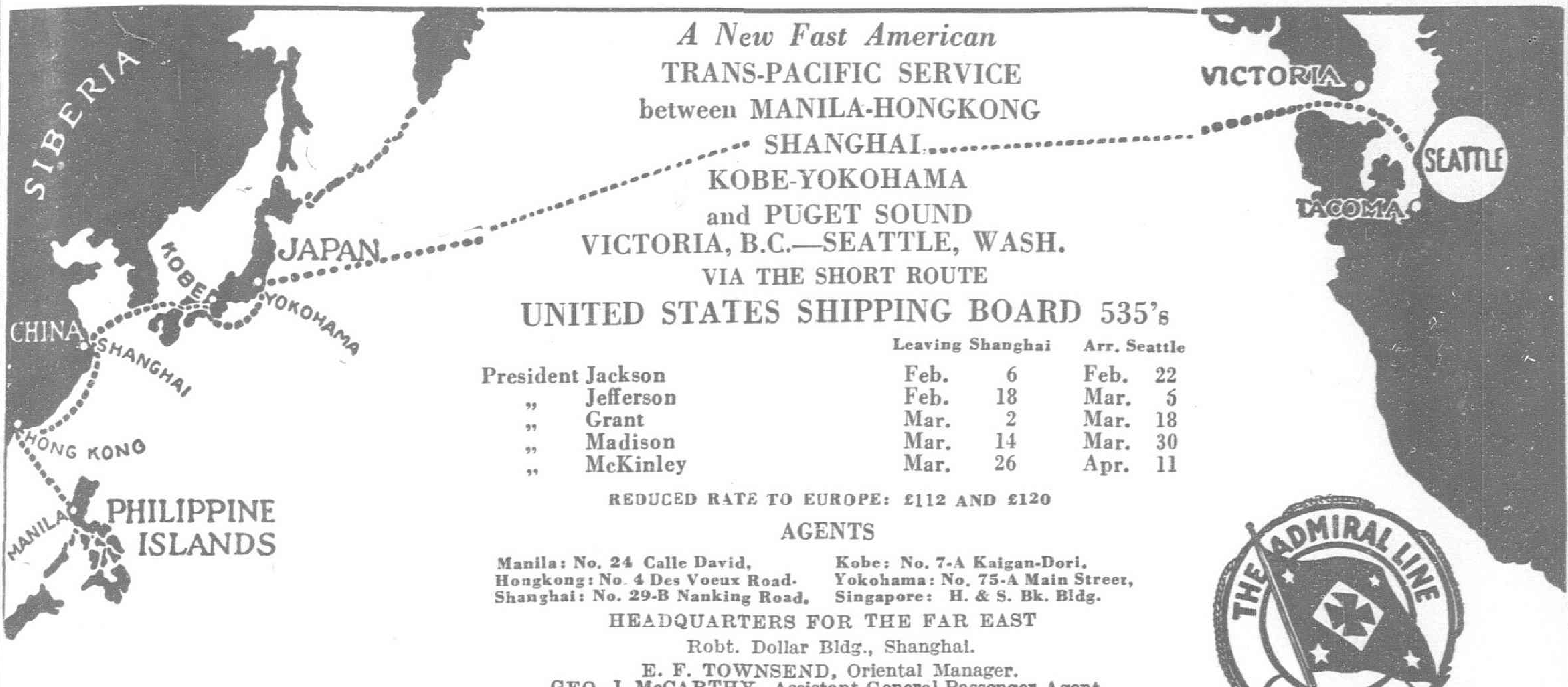

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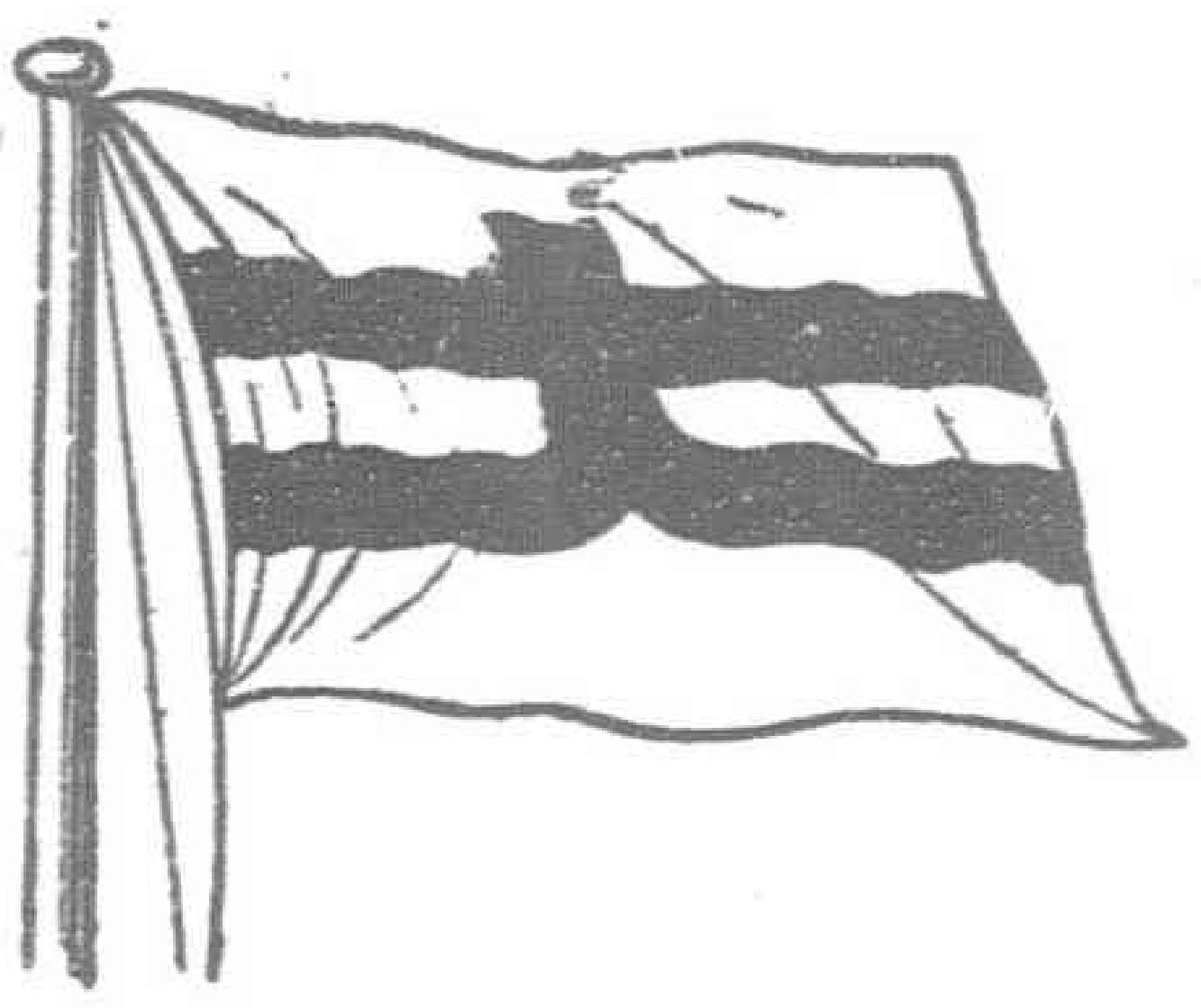
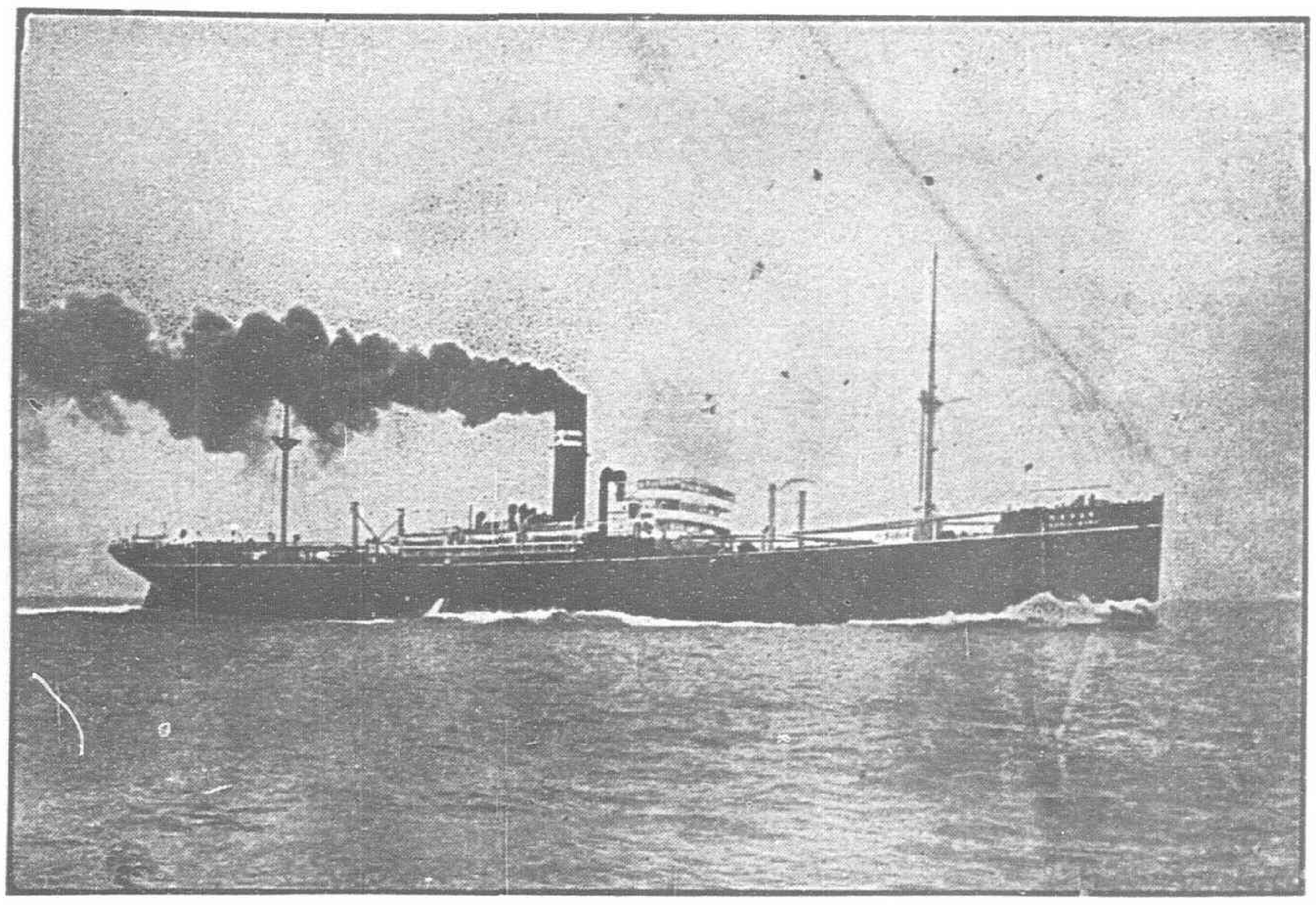


Capital: Y. 100,000,000

Reserves: Y. 66,000,000

40 Regular Lines with a Fleet of 500,000 Tons Gross.



PRINCIPAL REGULAR LINES:

JAPAN-EUROPE LINE (via Suez)—Monthly—Ports of Call: Yokohama, Kobe, Moji, Shanghai, Hongkong, Singapore, Colombo, Port Said, Marseilles, London, Antwerp, Rotterdam and Hamburg.

JAVA-EUROPE LINE:—Monthly—Ports of Call: Sourabaya, Padan, Colombo, Port Sudan, Suez, Genoa, Marseilles, Antwerp and Hamburg.

CALCUTTA-NEW ORLEANS LINE: 7 sailings per annum—Ports of Call: Calcutta, Singapore, Hongkong, Nagasaki, Kobe, Yokohama, San Francisco, Balboa, Cristbal, Cienfuegos and New Orleans.

SINGAPORE-NEW YORK LINE:—Monthly—Ports of Call: Singapore, Hongkong, Shanghai, Moji, Kobe, Yokohama, San Francisco, Balboa, Cristbal, Havana and New York.

JAPAN-BOMBAY LINE:—Fortnightly—Ports of Call: Yokohama, Yokkaichi, Osaka, Kobe, Moji, Hongkong, Singapore, Colombo and Bombay.

HONGKONG-PUGET SOUND LINE:—Fortnightly—Ports of Call: Hongkong, Manila, Keelung, Shanghai, Nagasaki, Kobe, Yokkaichi, Shimizu, Yokohama, Victoria, Seattle, Tacoma and Vancouver.

JAPAN-SOUTH AMERICA LINE:—Monthly—Ports of Call: Yokohama, Kobe, Nagasaki, Hongkong, Singapore, Colombo, Mauritius, Durban, Cape Town, Rio de Janeiro, Santos and Buenos Ayres.

JAPAN-AUSTRALIA LINE:—Monthly—Ports of Call: Yokohama, Kobe, Osaka, Moji, Hongkong, Manila, Sydney, Melbourne and Adelaide.

JAPAN-JAVA LINE:—Monthly—Ports of Call: Osaka, Kobe, Moji, Keelung, Manila, Sandakan, Tawao, Batavia, Sourabaya and Macassar.

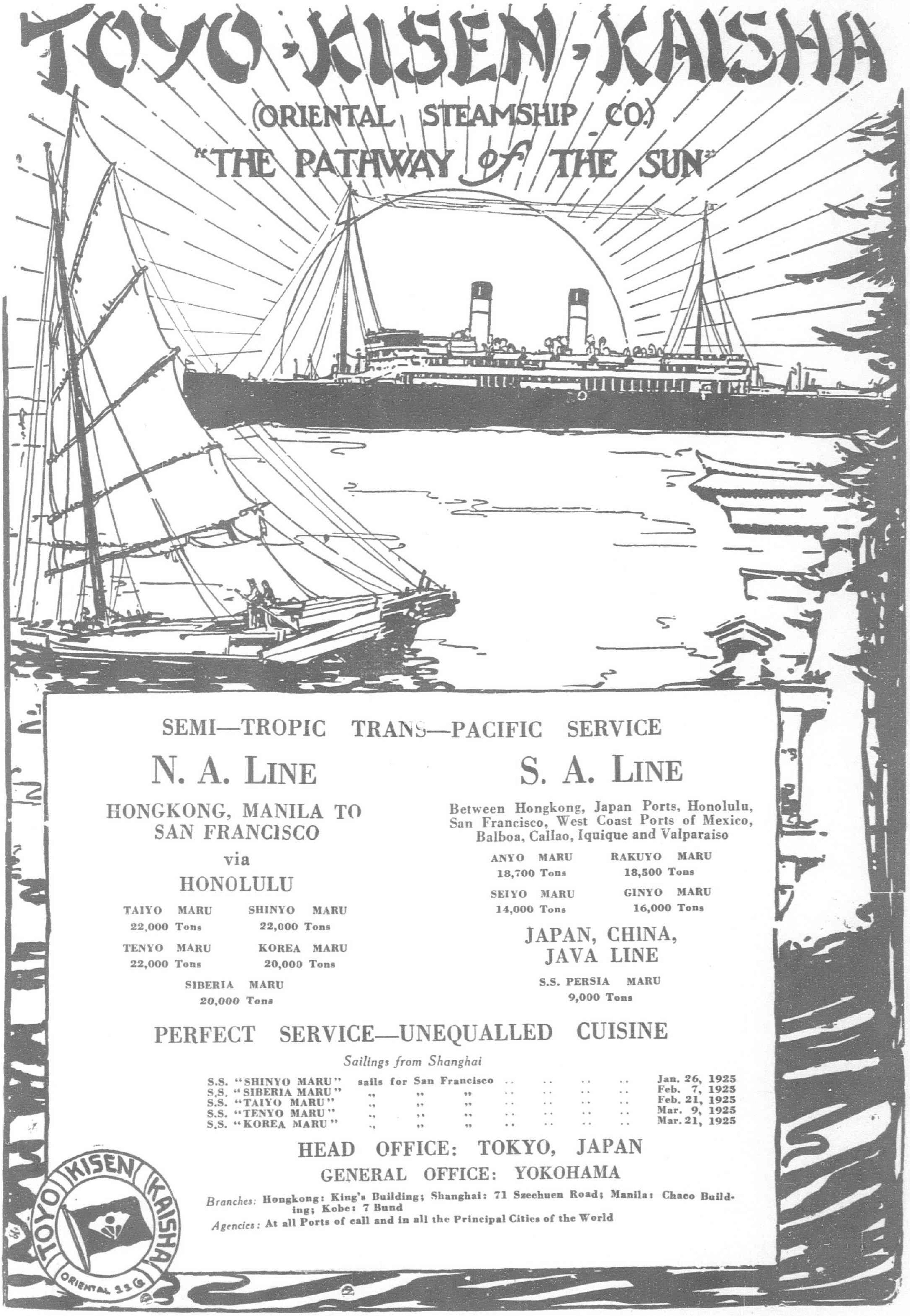
SERVICES TO CHINA.—

OSAKA—Dairen Line.—Semi-Weekly.
OSAKA—Tientsin Line.—6 Sailings per month.
OSAKA—Tsingtau Line.—2 Sailings per month.
YOKOHAMA—Dairen-Tientsin Line.—About 8 Sailings per month.
TAKAO—Tientsin Line.—2 Sailings per month.
Keelung-Hongkong Line.—Weekly.

Besides the above mentioned, Mail and Passenger Services are maintained by over THIRTY-FIVE REGULAR LINES, calling at all important ports in JAPAN, as well as STRAITS, DUTCH EAST-INDIES, FORMOSA, CHINA, KOREA, Etc., Etc.

COMPANY'S LOCAL OFFICES IN CHINA

AMOY, CANTON, FOOCHOW, HANKOW, SHANGHAI, TIENTSIN, DAIREN, HONGKONG



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via
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TAIYO MARU 22,000 Tons
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TENYO MARU 22,000 Tons
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Between Hongkong, Japan Ports, Honolulu, San Francisco, West Coast Ports of Mexico, Balboa, Callao, Iquique and Valparaiso

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S.S. "SIBERIA MARU" ,, ,, ,, ... Feb. 7, 1925
S.S. "TAIYO MARU" ,, ,, ,, ... Feb. 21, 1925
S.S. "TENYO MARU" ,, ,, ,, ... Mar. 9, 1925
S.S. "KOREA MARU" ,, ,, ,, ... Mar. 21, 1925

HEAD OFFICE: TOKYO, JAPAN

GENERAL OFFICE: YOKOHAMA

Branches: Hongkong: King's Building; Shanghai: 71 Szechuen Road; Manila: Chaco Building; Kobe: 7 Bund

Agencies: At all Ports of call and in all the Principal Cities of the World

Amoy
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Canton
Changsha
Chefoo
Chinkiang
Chungking
Dairen (Dalny)
Foochow
Hankow
Harbin
Hongkong

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HONGKONG TO, AND FROM,

Manila, Cebu. and Iloilo

Weihaiwei, Chefoo and Tientsin (for Peking)

Canton ; Hoihow, Pakhoi and Haiphong; Bangkok and Singapore.

Shanghai and Yangtze Ports (as above)

Sydney, Melbourne and Australian Ports (Australian-Oriental Line)

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Taikoo Dockyard & Engineering Company of Hongkong Ltd.

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Orient Insurance Company.

British Traders Insurance Co., Ltd.

Sea Insurance Co., Ltd.

Marine

British and Foreign Marine Insurance Co., Ltd.

Standard Marine Insurance Co., Ltd.

Royal Exchange Assurance Corporation.

Sea Insurance Co., Ltd.

Guardian Assurance Co., Ltd.

KOKUSAI KISEN KAISHA

Nominal Capital - -	Yen 100,000,000.00
Paid-up Capital - -	,, 87,500,000.00
Aggregate Tonnage - -	500,000 Tons

FLEET OF STEAMSHIPS

Name	Tons D.W.	Name	Tons D.W.
Rozan-Maru	8,700	Capetown-Maru	9,100
Vancouver-Maru	9,100	Suez-Maru	6,600
Boston-Maru	8,800	Daio-Maru	9,000
Tofuku-Maru	9,100	Kashu-Maru	8,800
Chifuku-Maru	9,100	No. 2 Kifunesan-Maru	5,000
Ryufuku-Maru	9,100	Yousan-Maru	5,000
Hankow-Maru	6,400	Taisan-Maru	5,000
Yoni-Maru	11,000	Yuri-Maru	11,000
Taibu-Maru	8,900	Texas-Maru	11,000
San Francisco-Maru	9,100	Tamatsu-Maru	6,600
Naple-Maru	9,100	Eifuku-Maru	9,100
Glasgow-Maru	9,100	Kifuku-Maru	9,100
Yayoi-Maru	8,700	Toyofuku-Maru	9,000
Yaye-Maru	11,000	Raifuku-Maru	9,100
Malta-Maru	8,700	Keifuku-Maru	9,100
Buyo-Maru	8,800	Washington-Maru	9,100
Brazil-Maru	9,100	Tokufuku-Maru	9,100
Kofuku-Maru	9,100	Portland-Maru	9,100
Yezari-Maru	6,900	England-Maru	9,100
Yugao-Maru	5,000	Chili-Maru	9,100
Yubaye-Maru	5,000	Argentine-Maru	9,100
Sydney-Maru	6,400	Port Said-Maru	9,100
Shanghai-Maru	6,400	New York-Maru	9,100
Singapore-Maru	9,100	Karorin-Maru	6,400
Jyufuku-Maru	9,100	Tasmania-Maru	6,400
Hiyeizan-Maru	6,700		

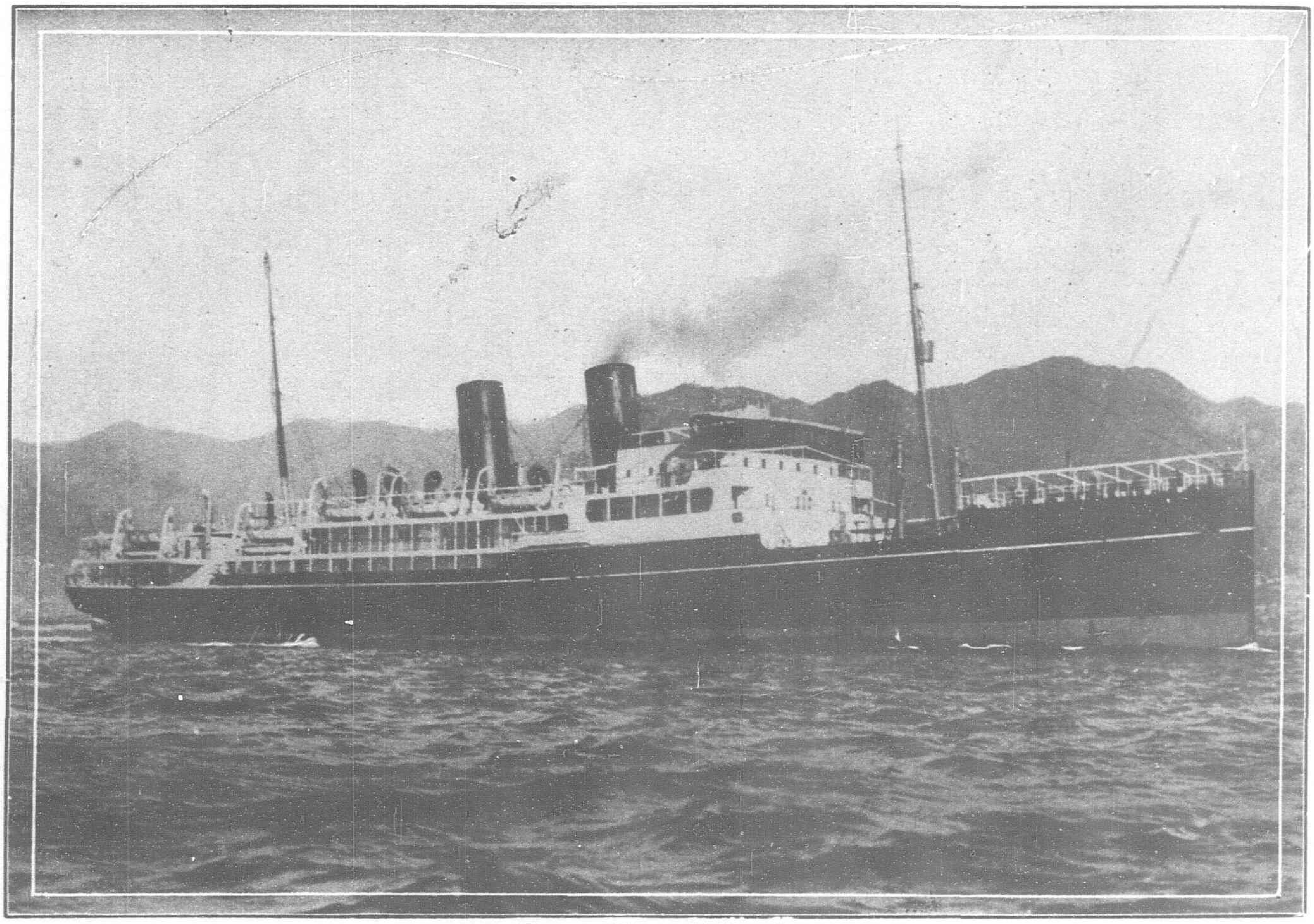
Head Office: No. 8 Kaigan-dori, Kobe

BRANCH OFFICE:

Tokyo Kaijo Building, Marunouchi, Tokyo, Japan

N. Y. K. LINE

(NIPPON YUSEN KAISHA)
HEAD OFFICE: TOKYO, JAPAN



The s.s. "Nagasaki Maru"

JAPAN-CHINA RAPID EXPRESS LINERS

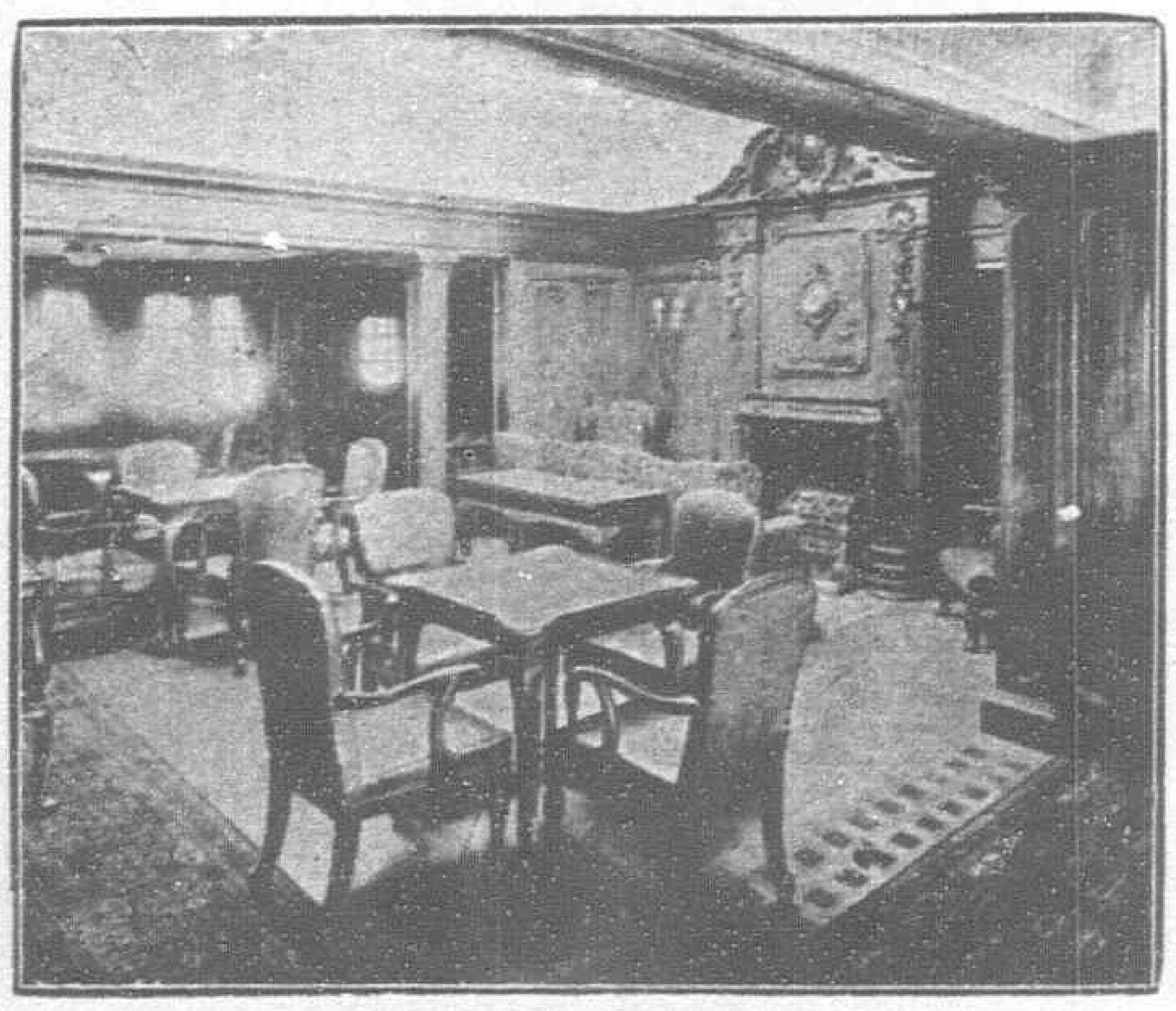
s.s. "Nagasaki Maru," s.s. "Shanghai Maru," 5,500 tons each, 26 hours' voyage
Between Shanghai and Nagasaki, Single passage rates: $35—$80

PROPOSED SAILINGS (Twice a week)

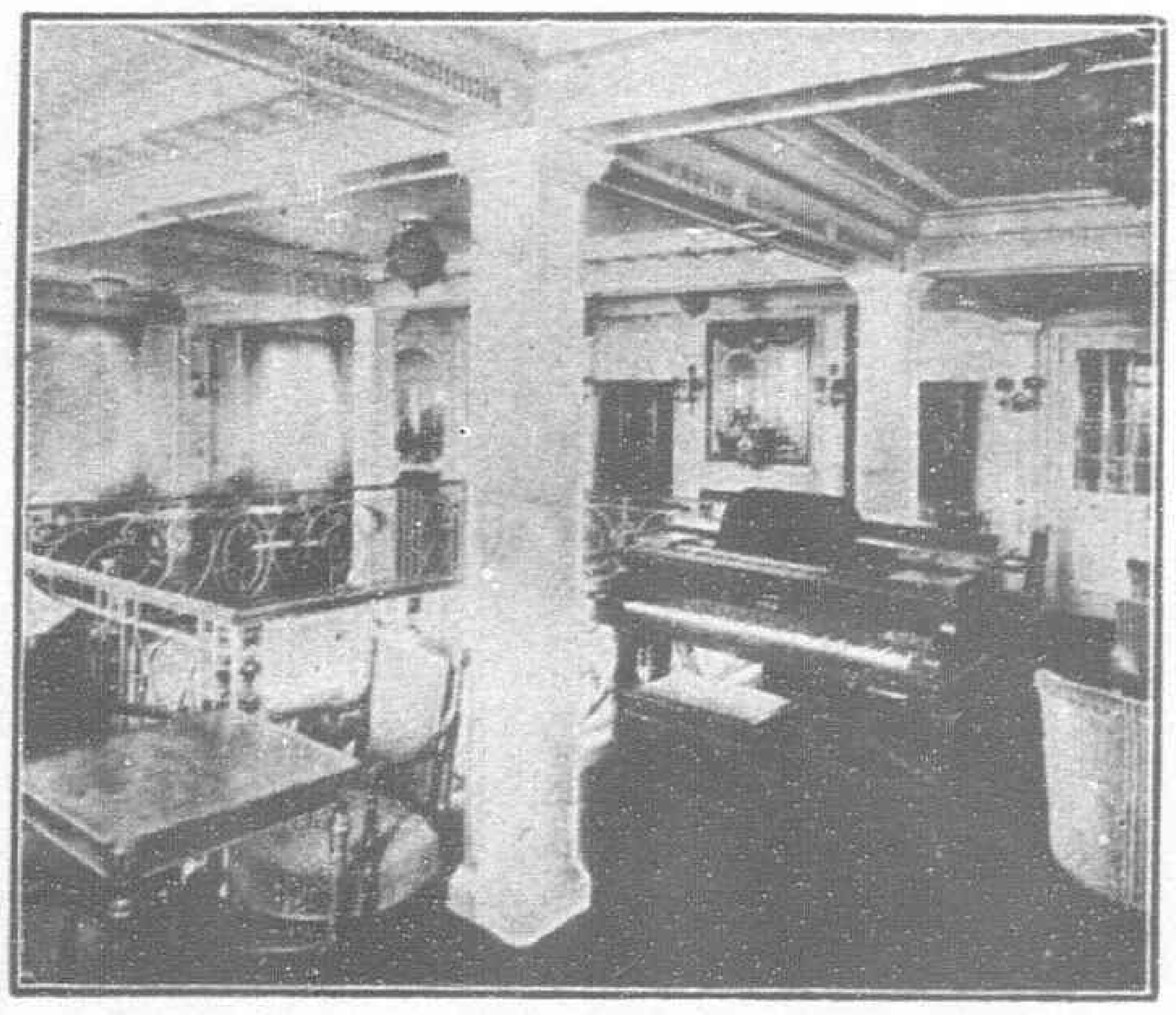
China-Bound	Japan-Bound
Leave Nagasaki 9 a.m. Wed. & Sun.*	Leave Shanghai 6 a.m. Fri. & Tues.*
Arrive Shanghai Noon Thurs. & Mon.*	Arrive Nagasaki 10 a.m. Sat. & Wed.*

*Sailing dates for the "Shanghai Maru" Effective from March

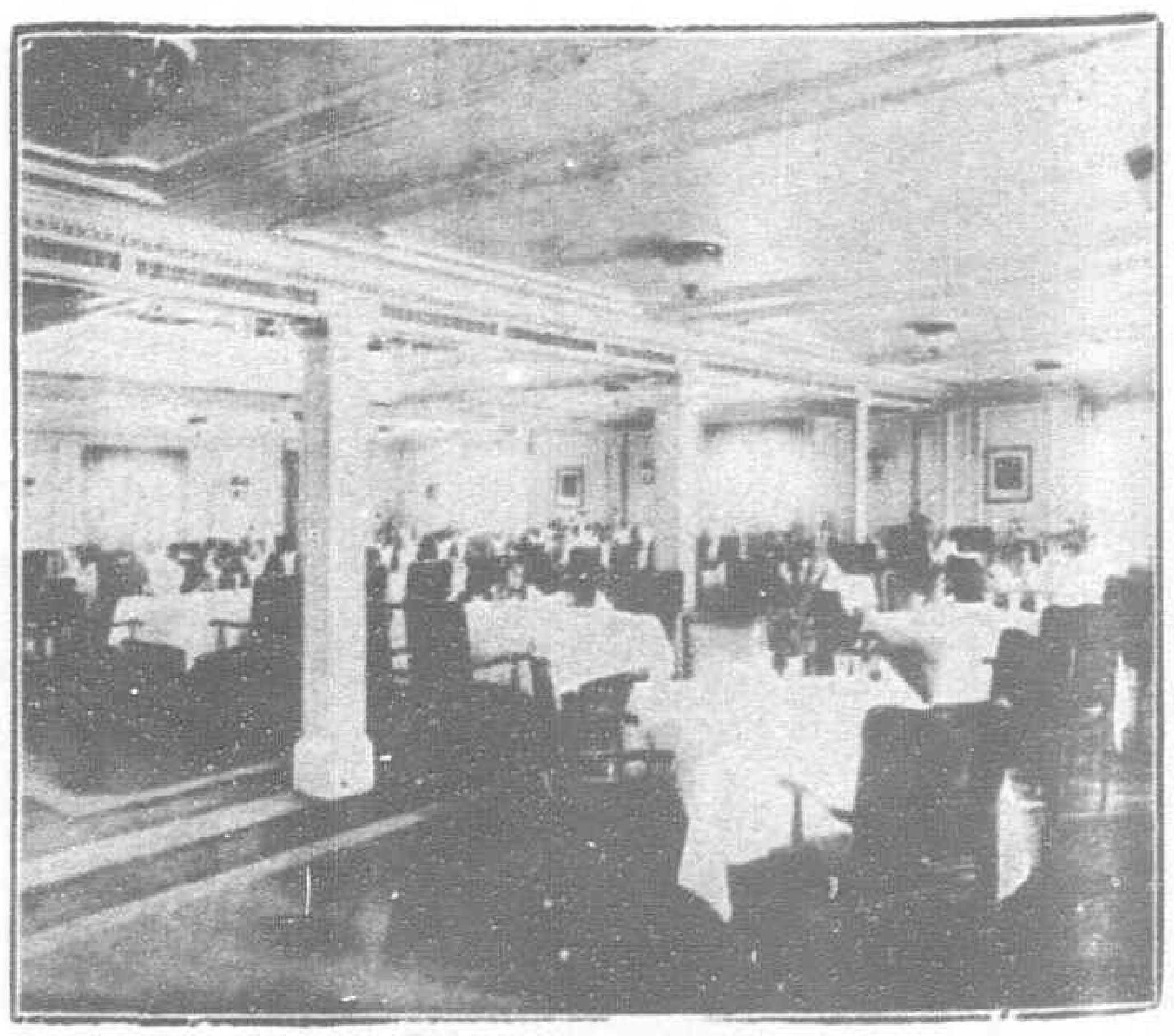
COMFORT — CLEANLINESS — COURTESY



Smoking Room



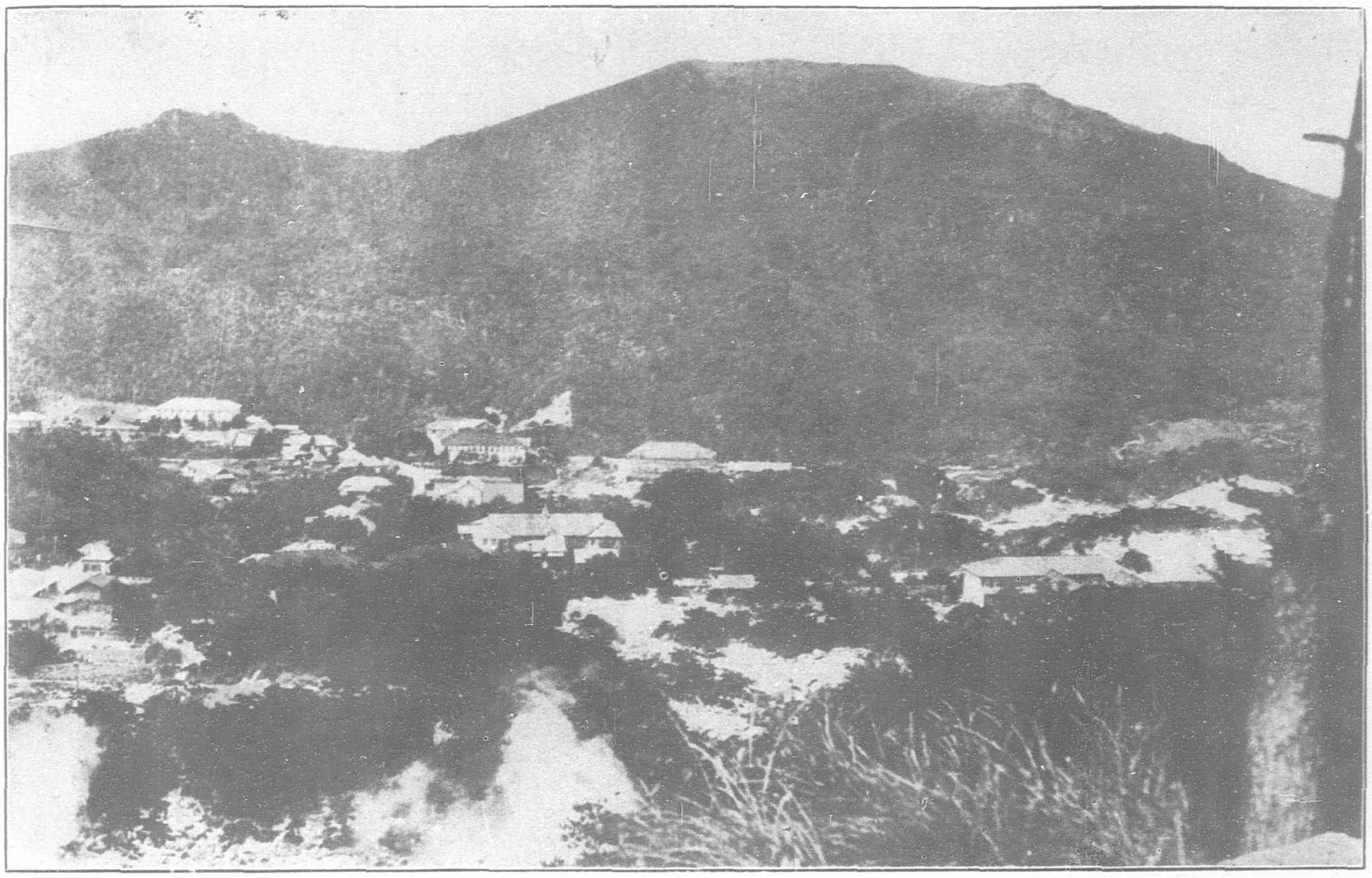
Social Hall



Dining Saloon

N. Y. K. LINE

FLEET: 110 steamers; 600,000 gross tons



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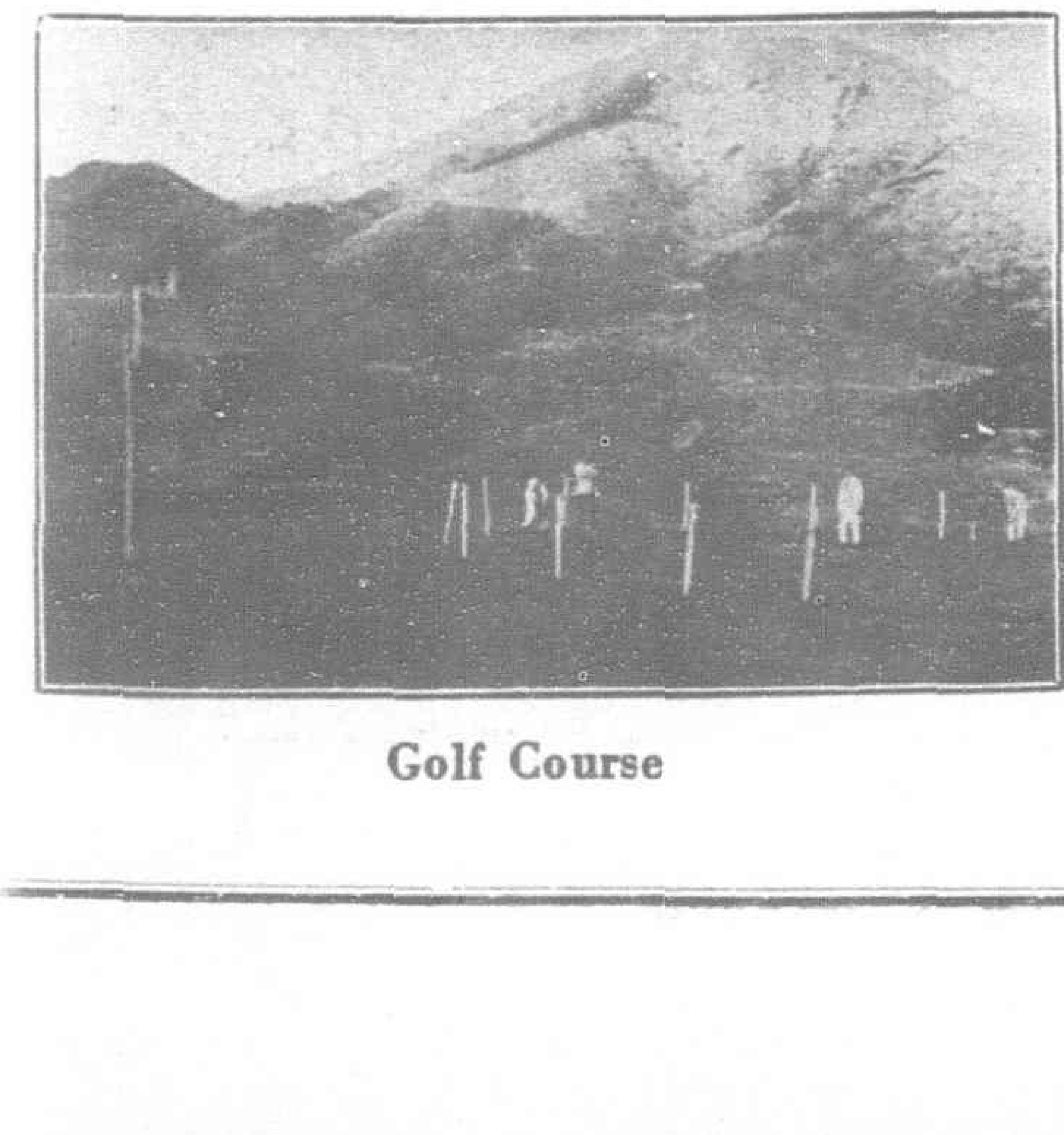
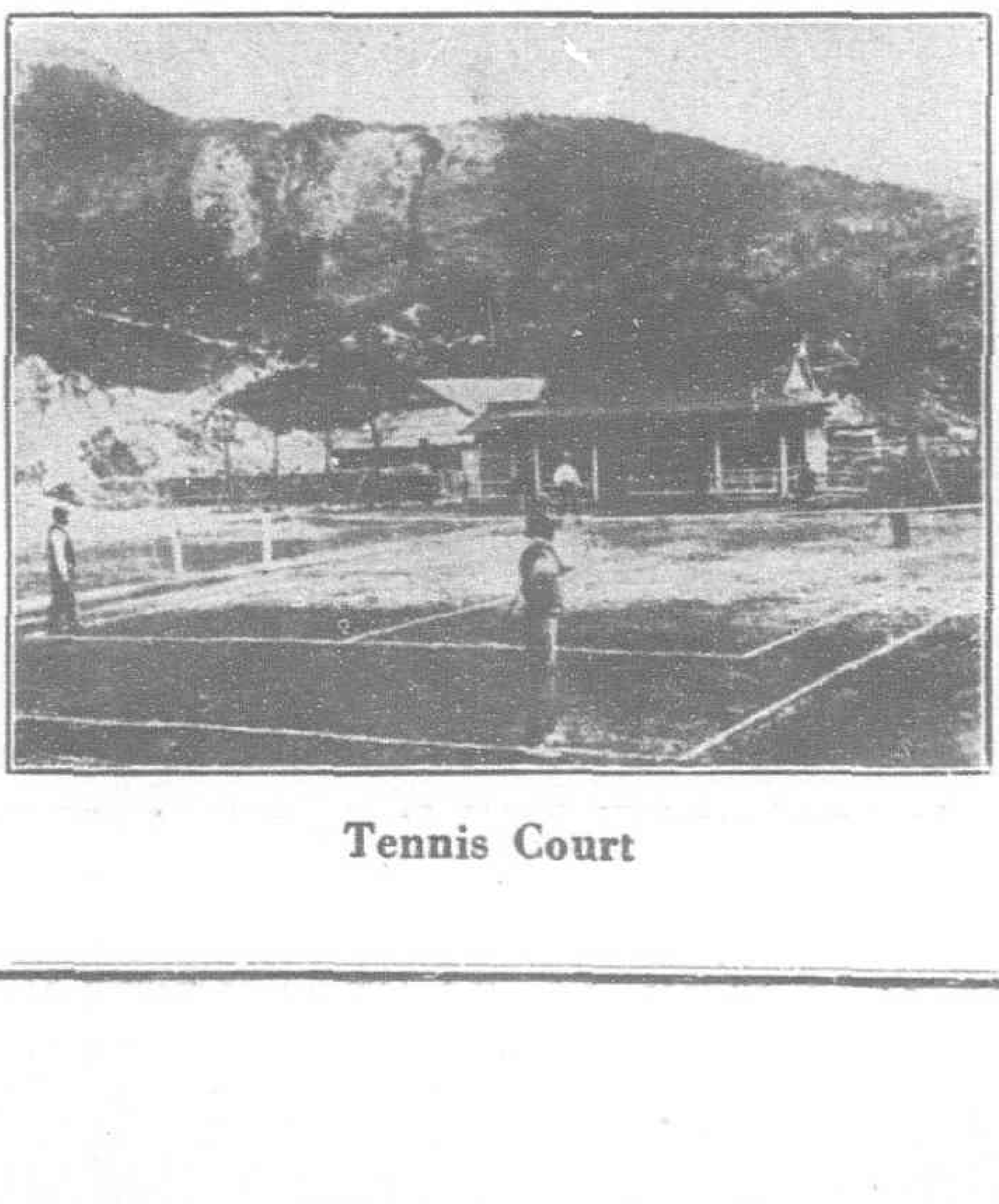
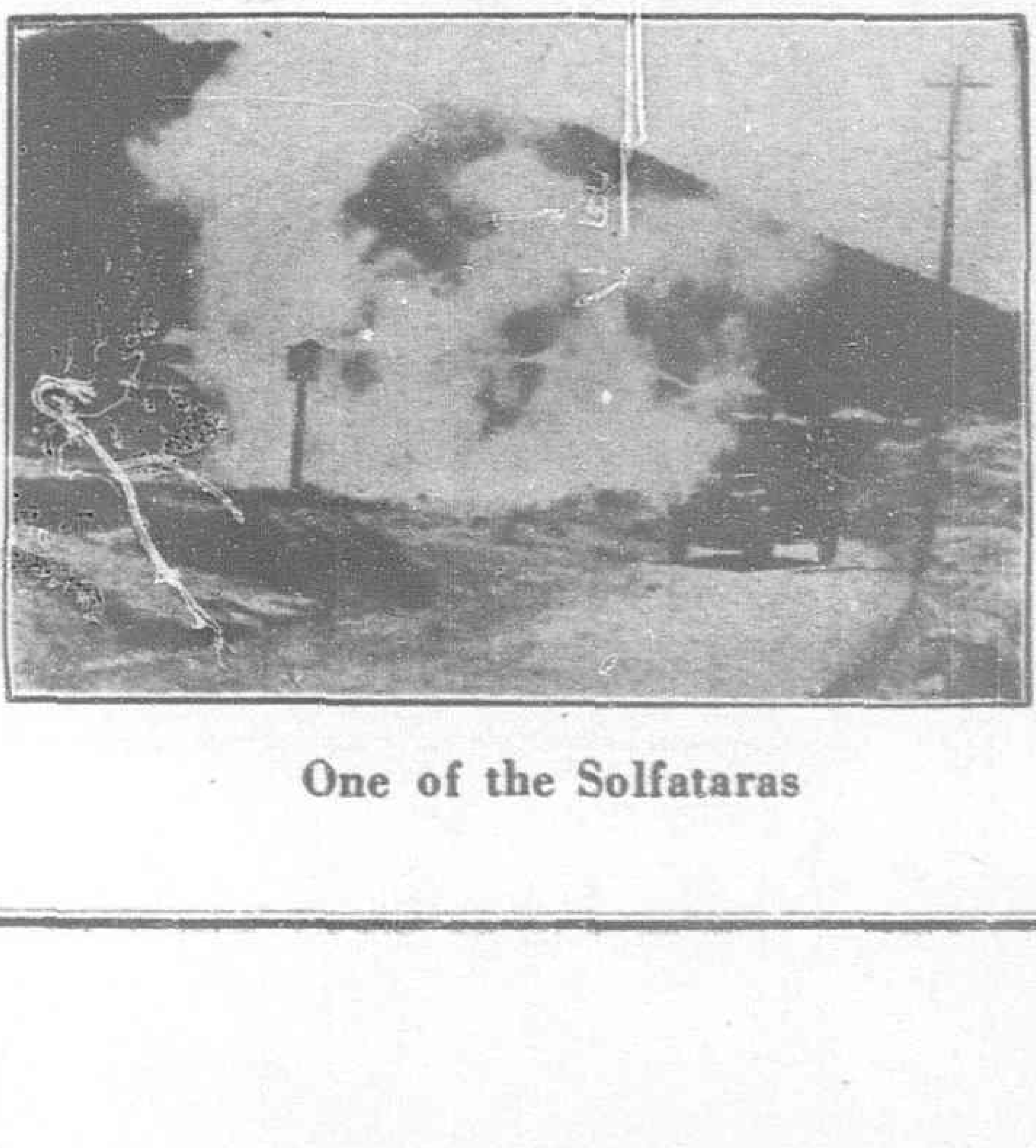


Golf Course



Tennis Court



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Bombay
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Cebu
Colombo
Delhi
Haiphong
Hamburg
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Hongkong
Iloilo
Ipoh
Karachi
Klang
Kobe
Kuala-Lumpur (F.M.S.)
Kuching (Sarawak)
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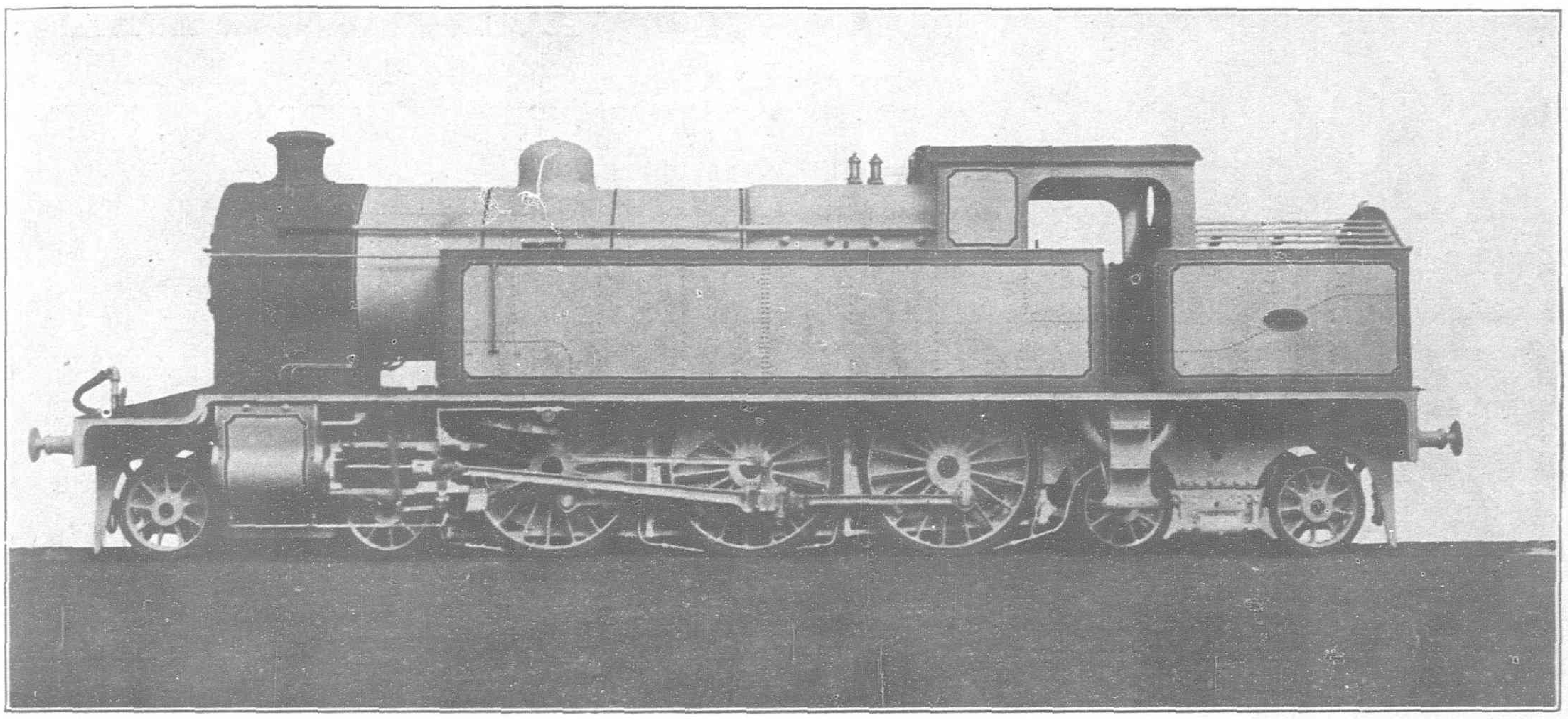
PEKING



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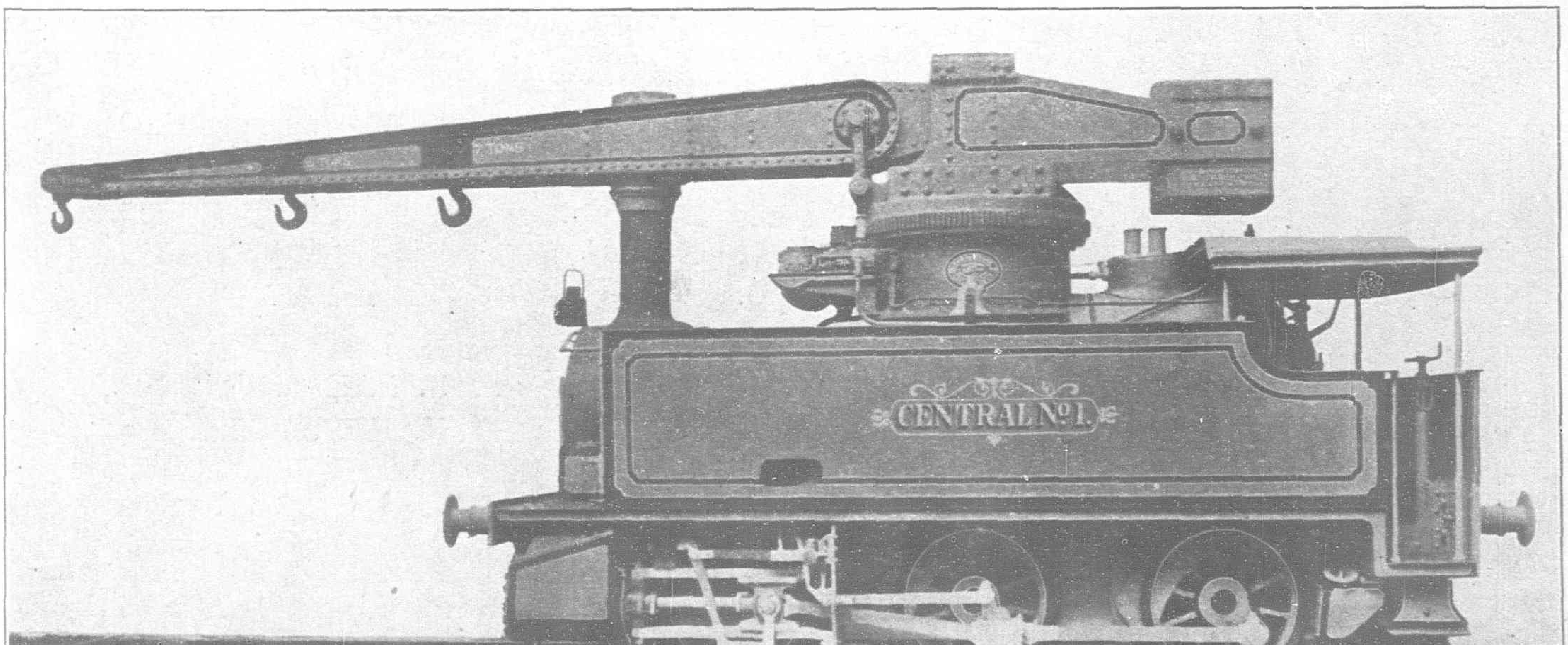

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SHANGHAI OFFICE: 8 Hankow Road
TIENTSIN OFFICE: 42 Rue de France, French Concession

Capital Subscribed	Yen 50,000,000.00
Capital paid-up	Yen 20,250,000.00
Reserve Funds	Yen 26,825,000.00

MATAZO KITA, Esq., *President*
ATUSHI YAMADA, Esq., *Vice-President*

Directors :

K. SUYEYOSHI, Esq.
H. OHOKA, Esq.
G. IMAMURA, Esq.
T. SHIKATA, Esq.
T. YASUI, Esq.
R. NAKAMURA, Esq.
K. KUSUMOTO, Esq.

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AGENCIES: Kobe, Yokohama, Tokyo, Seito, Tientsin, Newchwang, Tiehling, Changchung, Harbin, Hongkong, Calcutta, Karachi, Rangoon, Alexandria, Liverpool, New York and Buenos Aires
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Capital Paid-up - - - Yen 50,000,000

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Deputy-Governor : S. Suzuki, Esq.

Directors :

Y. Katayama, Esq. M. Hashimoto, Esq.
I. Iuchi, Esq. T. Kakiuchi, Esq.

Head Office: SEOUL (Korea)

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(All communications relating to correspondence arrangements and the Bank's general foreign business to be addressed to the Foreign Department)

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Korea—Chemulpo, Pyengyang, Fusan, Wonsan, Taiku, Chinnampo, Kunsan, Mokpo, Hoilyong, Chungjin
Manchuria—Antung, Mukden, New Town (Mukden), Dairen, Yingkow (Newchwang), Changchun, Harbin, Tiehling, Liaoyang, Ryojun, Kaiyuan, Chengchiatun, Szupingchieh, Fuchiatien, Kirin, Lungchingtsun
China Proper—Shanghai, Tientsin, Tsingtao, Tsinan
Siberia—Vladivostok, Alexandrofsky Port

NEW YORK AGENCY :

G. Benenson Investing Building, 165 Broadway, New York City

LONDON REPRESENTATIVE :

Palmerston House, 34 Old Broad Street, London, E. C. 2

Correspondents:

San Francisco, Seattle, New York, London, Paris and in other commercial centers throughout the world

International Banking Corporation

CAPITAL AND SURPLUS - - - U.S. $10,000,000.00

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Branches:

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CALCUTTA
CANTON
CEBU
COLON
DAIREN
HANKOW
HARBIN
HONGKONG
KOBE
MADRID
MANILA
PANAMA
PEKING
RANGOON
SAN FRANCISCO
SANTO DOMINGO
SHANGHAI
SINGAPORE
TIENTSIN
TOKIO
YOKOHAMA

Commercial and Travellers' Letters of Credit, Bills of Exchange and Cable Transfers bought and sold. Current Accounts and Savings Bank Accounts opened and Fixed Deposits in local and foreign currencies taken at rates that may be ascertained on application to the Bank.

We are also able to offer our Customers the services of the Branches of the National City Bank of New York in the principal countries of Europe, South America and in the West Indies.

N. S. MARSHALL, *Manager.*

1A KIUKIANG ROAD.

BANQUE DE L'INDO-CHINE.

Capital	**Frs. 72,000,000**
Reserves	**„ 70,000,000**

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- Battambang
- Canton
- Djibouti
- Haiphong
- Hankéou
- Hanoi
- Hongkong
- Mongtze
- Noumèa
- Papeete
- Peking
- Pnom-Penh
- Pondichery
- Saigon
- Shanghai
- Singapore
- Tientsin
- Tourane

Bankers:

IN FRANCE: Comptoir National d'Escompte de Paris, Credit Lyonnais; Banque de Paris et des Pays-Bas; Crédit Industriel et Commercial Société Générale.

IN LONDON: The National Provincial and Union Bank of England, Ltd.; Comptoir National d'Escompte de Paris; Crédit Lyonnais.

The Shanghai Agency undertakes all banking operations and exchange business; grants credits on goods and approved securities and receives deposits on current and fixed deposits according to arrangement.

L. ARDAIN, *Manager*.

JUGO GINKO, LIMITED

(THE FIFTEENTH BANK)
TOKYO, JAPAN

Telegrams: "Jugo Tokyo"

Capital Subscribed Y. 100,000,000 Capital Paid-up Y. 49,750,000 Reserve Funds Y. 29,902,740

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***Head Office Manager*: Eikichi Tatsuoka, Esq.**
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THE

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CAPITAL PAID-UP - - - Yen 30,000,000

CHAIRMAN:

Mr. Manzo Kushida

MANAGING DIRECTORS:

Mr. Kiyoshi Sejimo Mr. Takeo Kato
Mr. Toru Otobe

HEAD OFFICE:

No. 3 Yayesucho Nichome, Kojimachi-ku,
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Capital Subscribed.............	Y. 100,000,000.00
Capital Paid-Up.................	Y. 60,000,000.00
Reserve Funds(September 1924)	Y. 47,100,000.00

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K. IYANAGA, Esq., Director
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	Issued and fully paid up	$20,000,000
Reserve Funds:	Sterling	£4,500,000
	Silver	$25,500,000
	Reserve Liability of Proprietors	$20,000,000

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OSAKA BRANCH: 28 Bingo-machi, Nichome
KYOTO BRANCH: Shijo Higashinotoin
SHINMACHI BRANCH: Shinmachi Dori Sanchome

President: K. IKEDA, Esq.

Managing Director: S. CHOH, Esq.

SUBSCRIBED CAPITAL	Yen 25,000,000
CAPITAL PAID-UP	Yen 17,500,000
RESERVE FUND	Yen 8,094,340
DEPOSITS	Yen 110,740,264

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K. YUKAWA ... ... Managing Director
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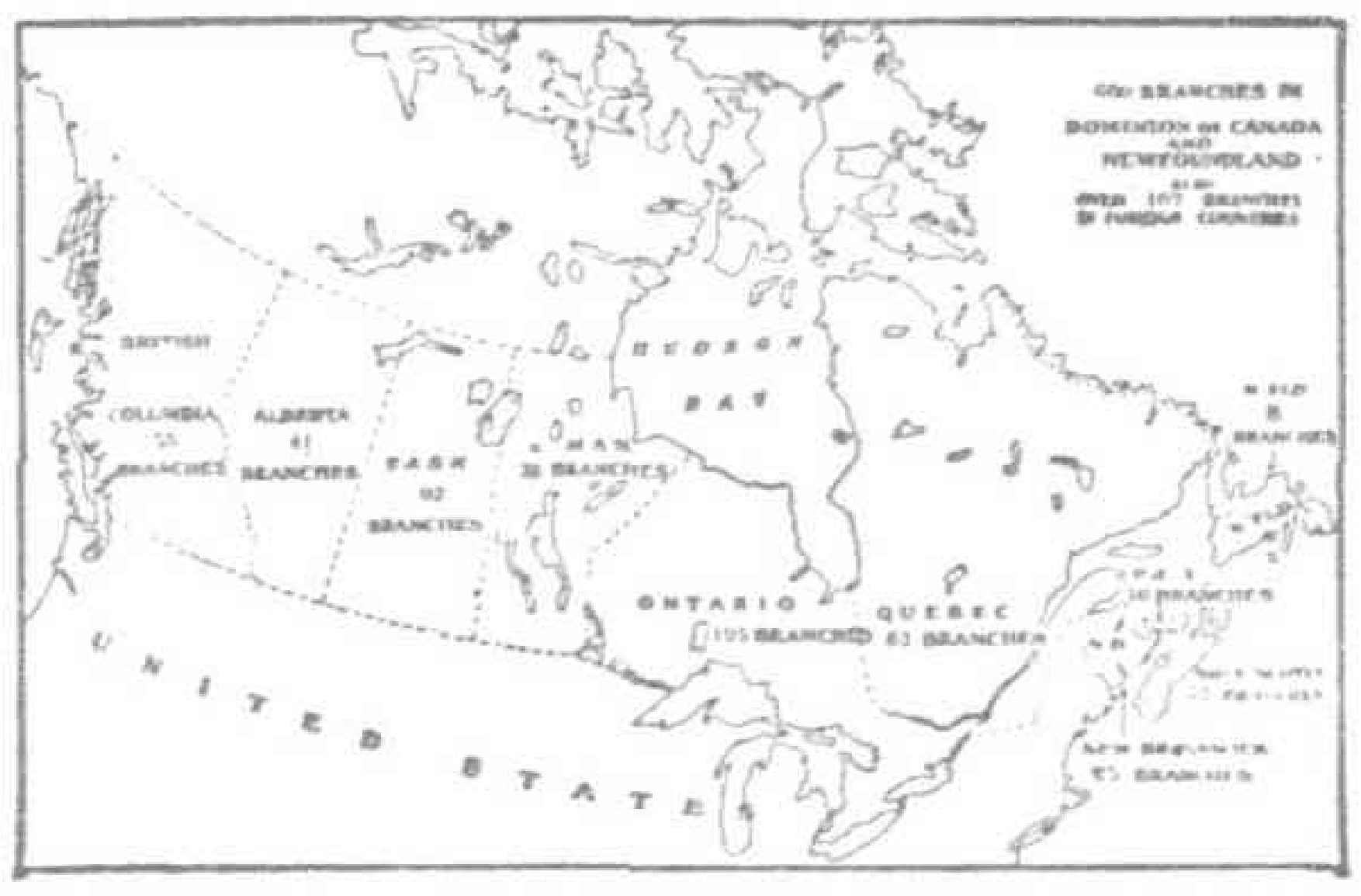

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Capital Paid-up	Y. 52,500,000
Reserve Funds	Y. 11,780,000

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Vice-President :

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T. AKASHI, *Manager*

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HOME BRANCHES:

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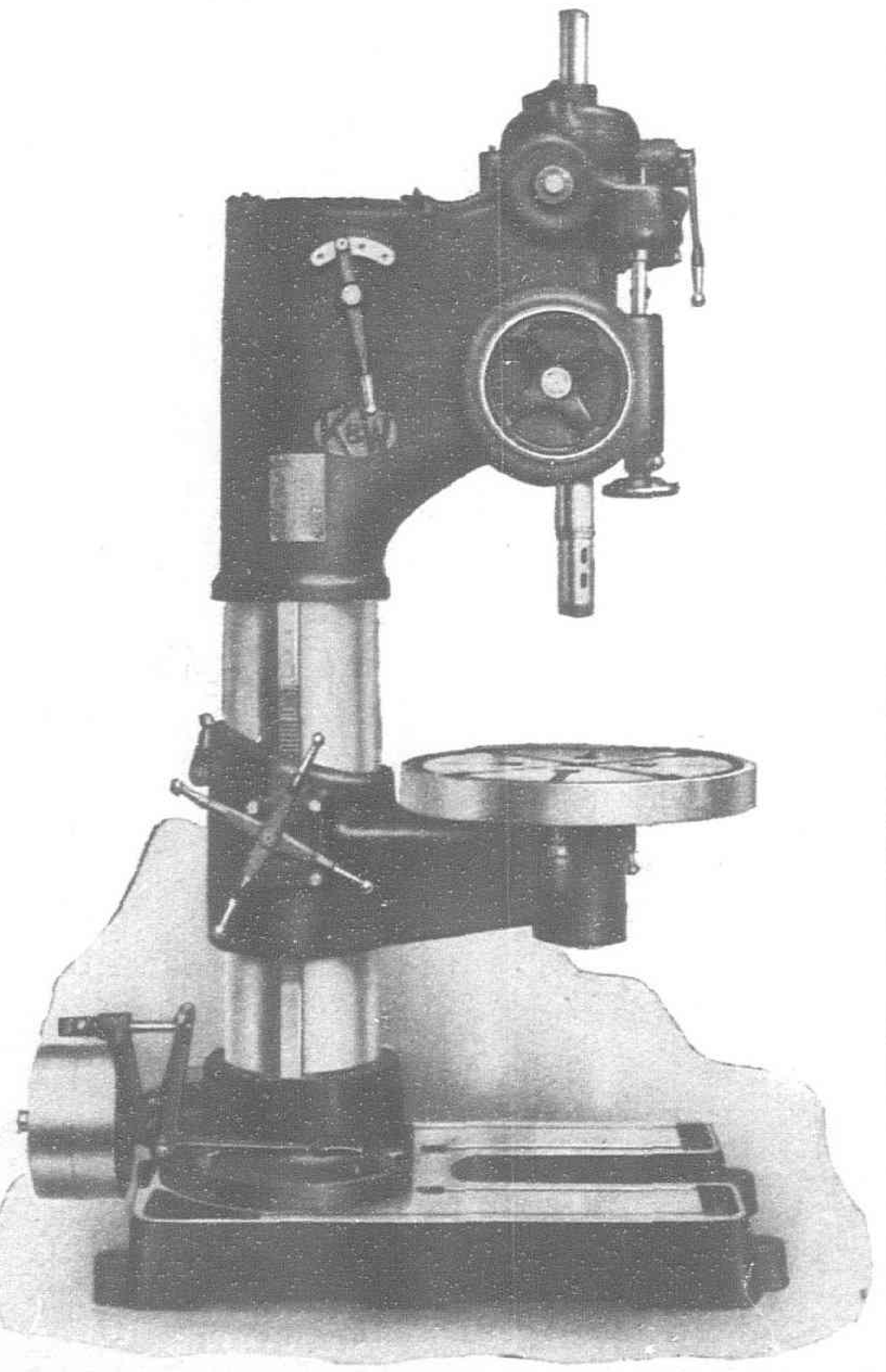

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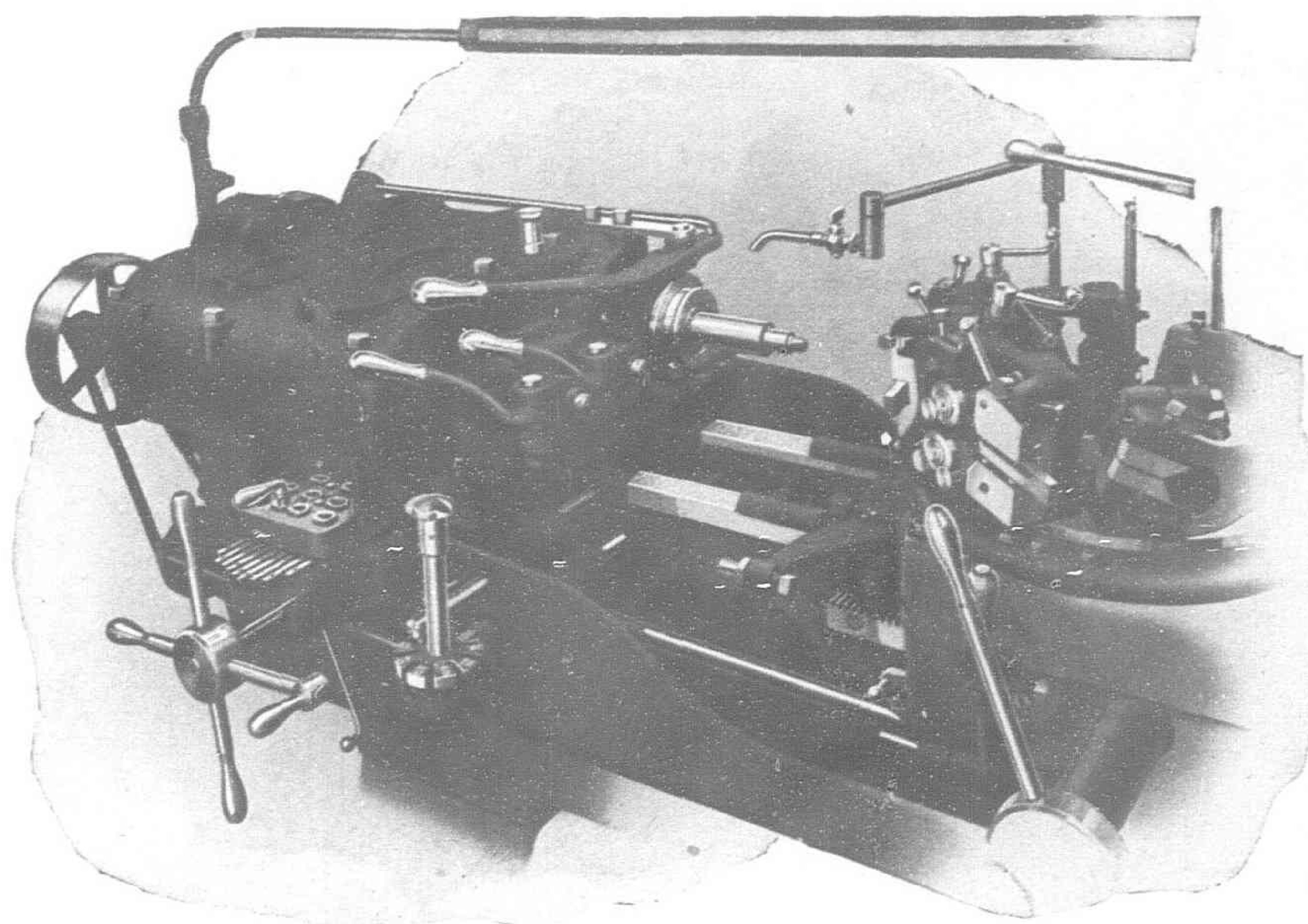

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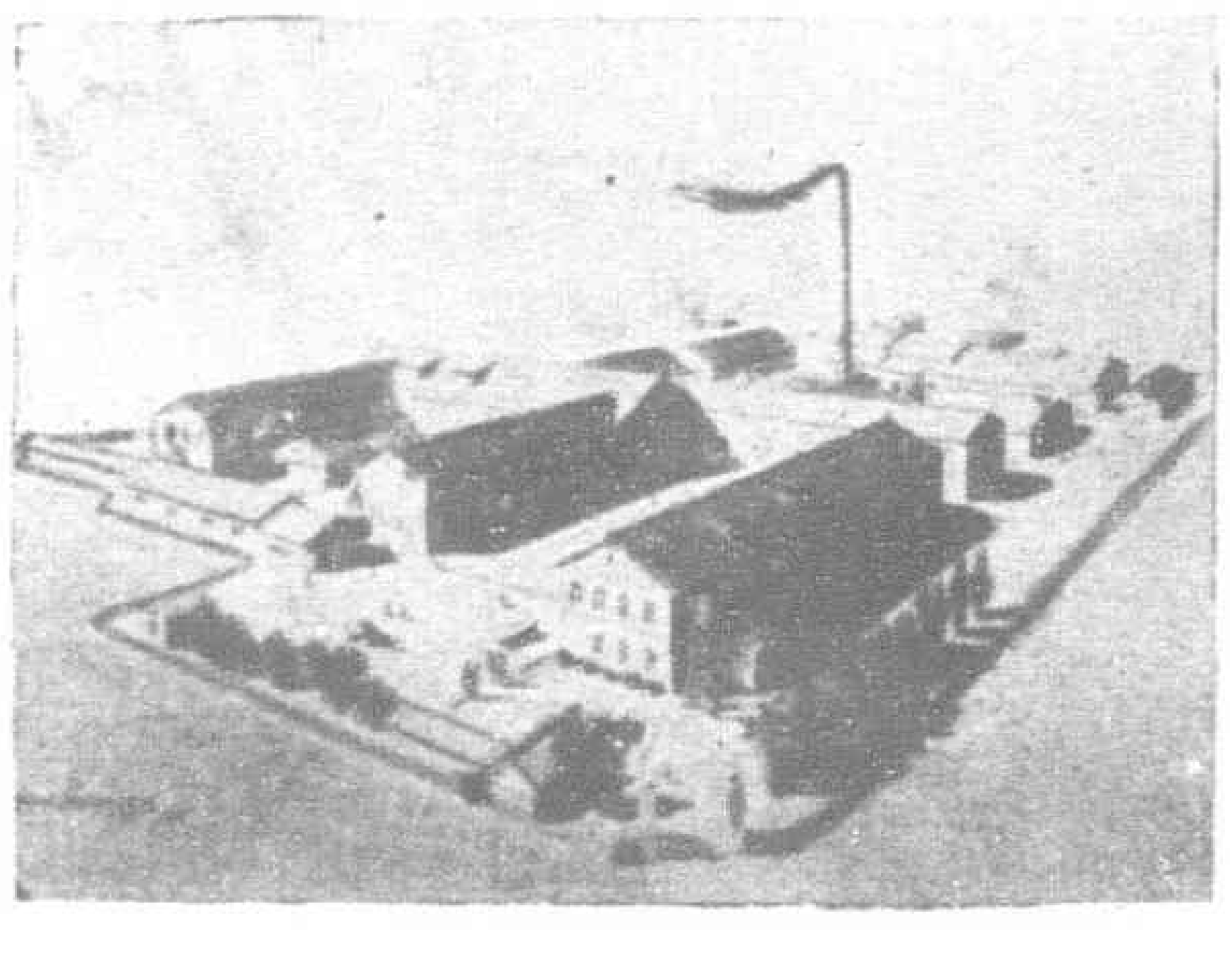

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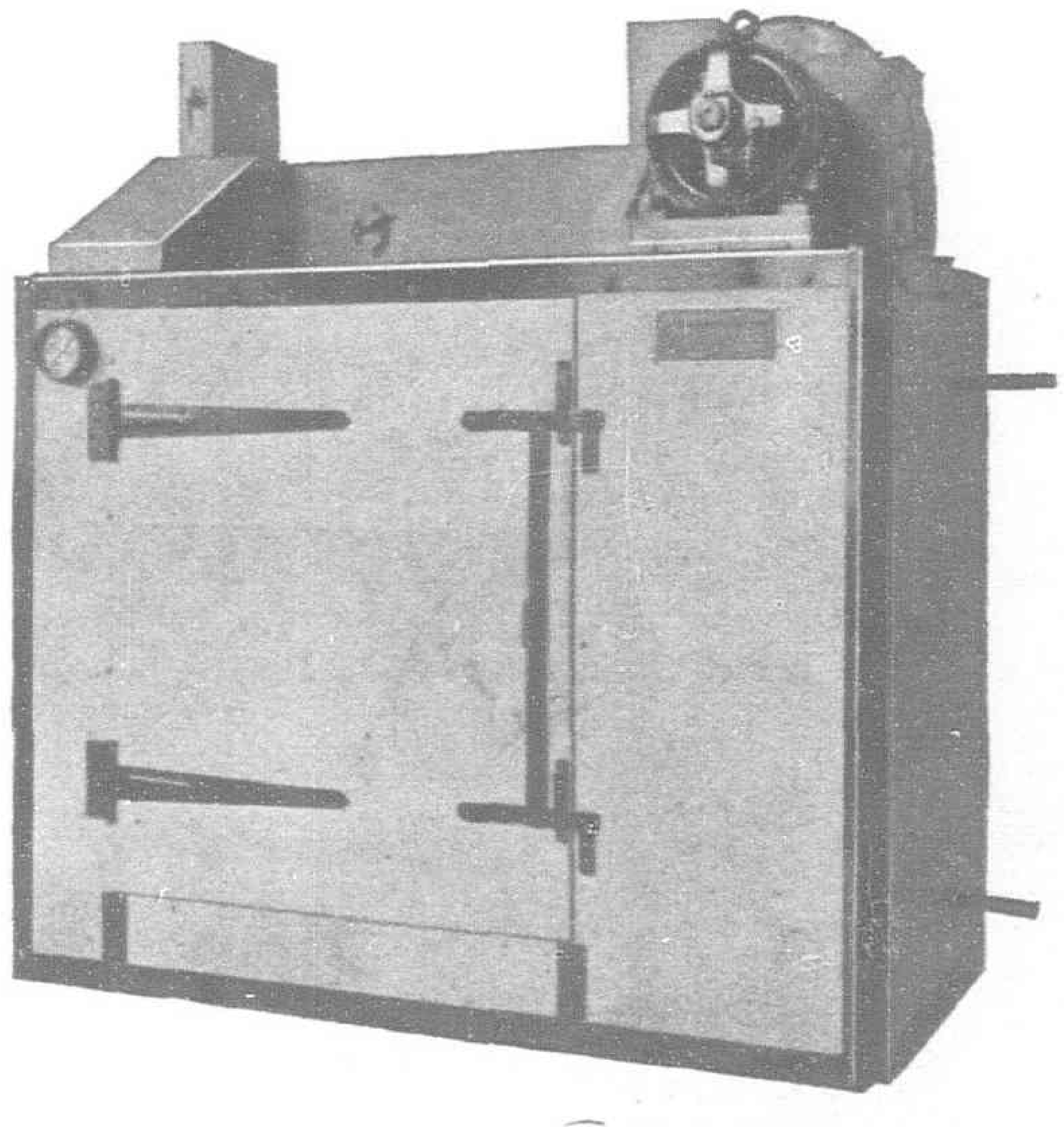

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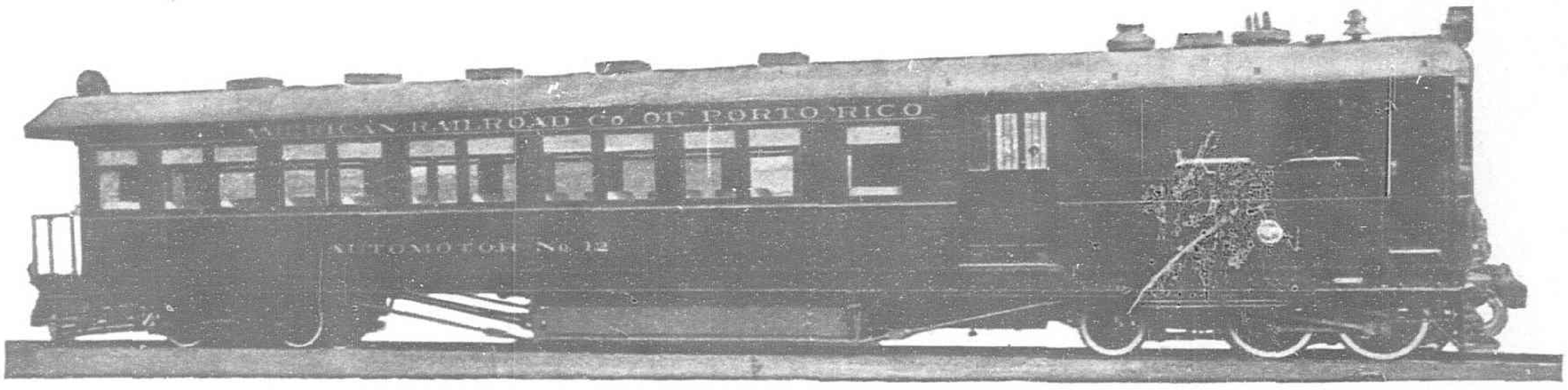

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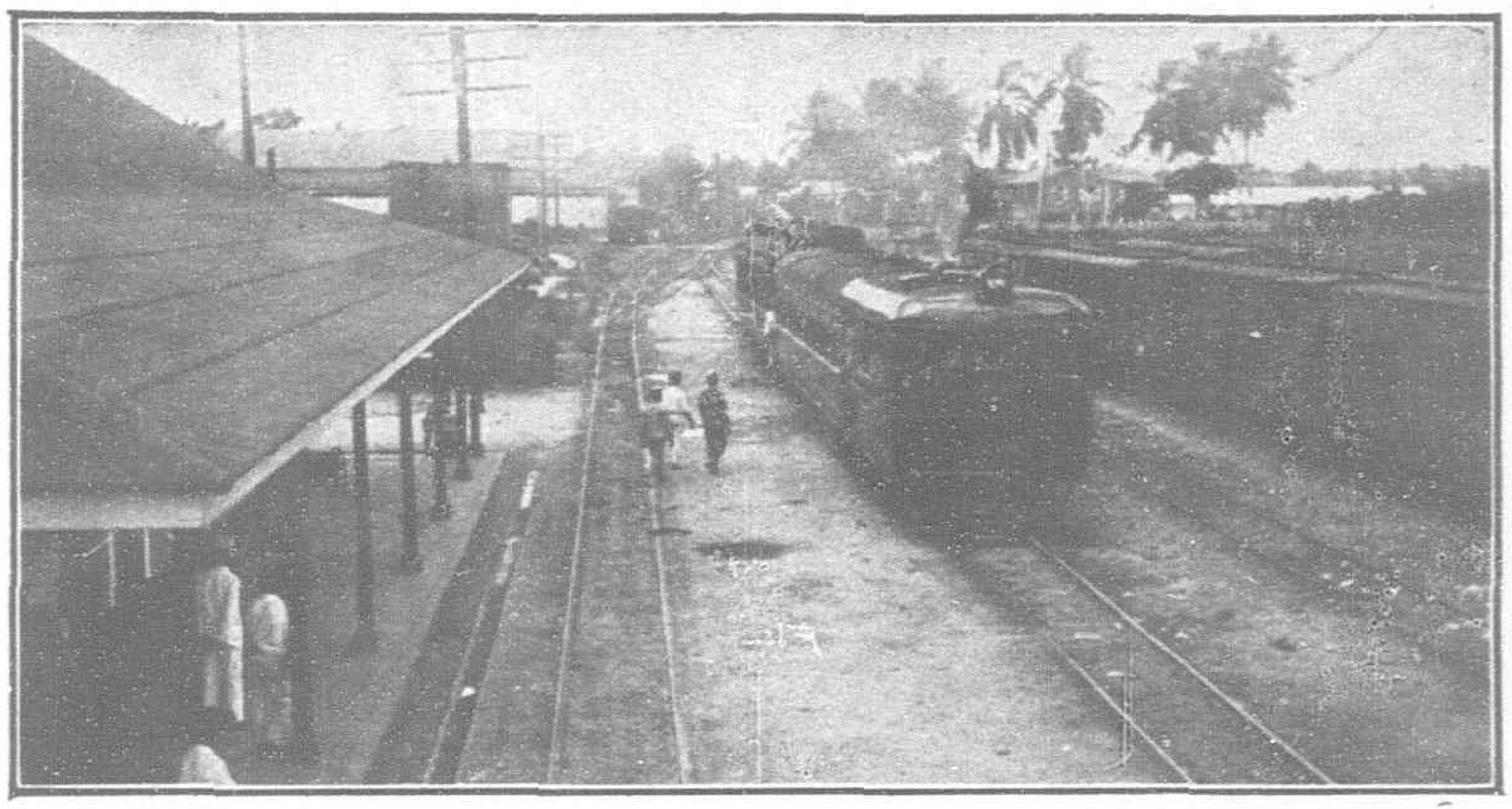

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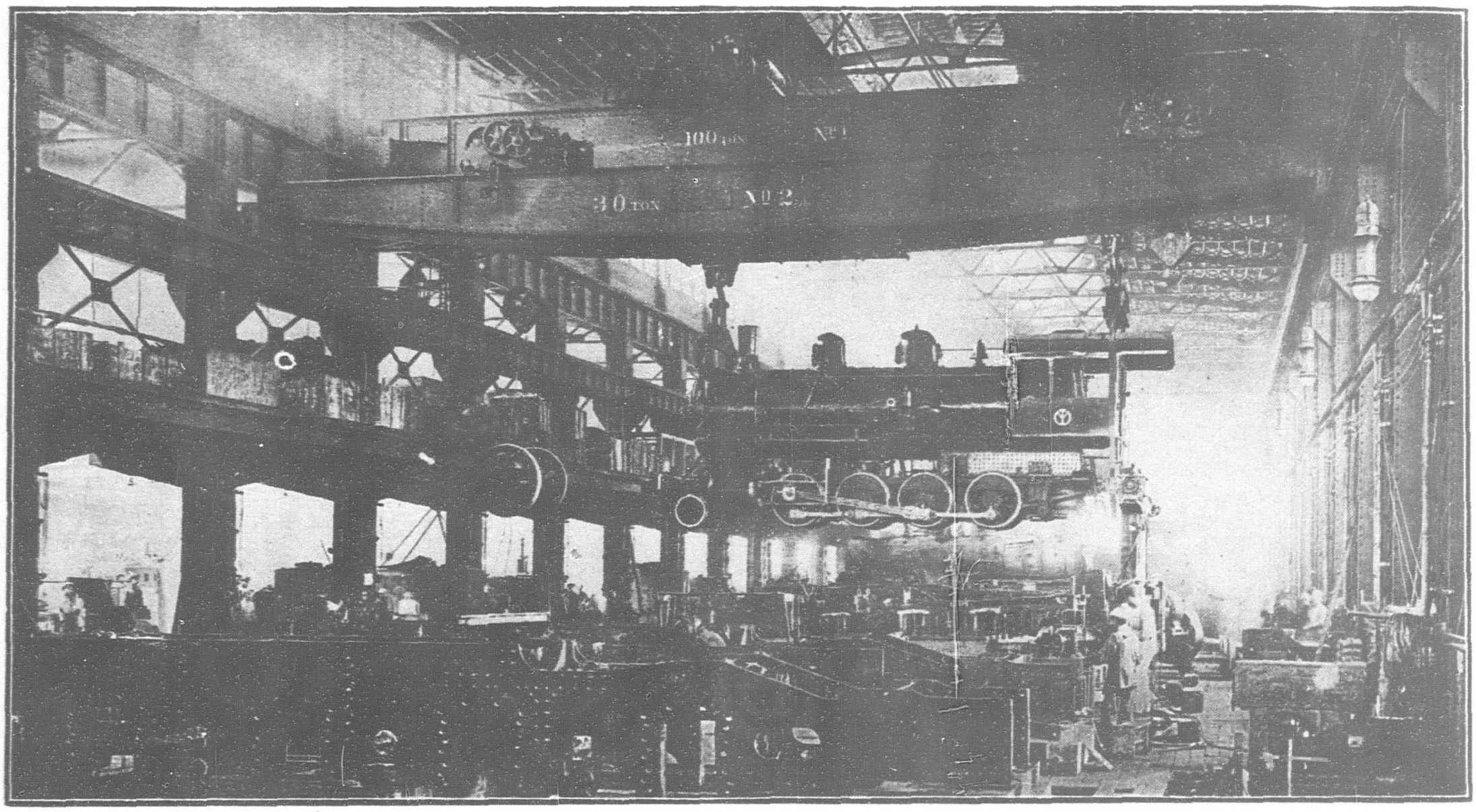

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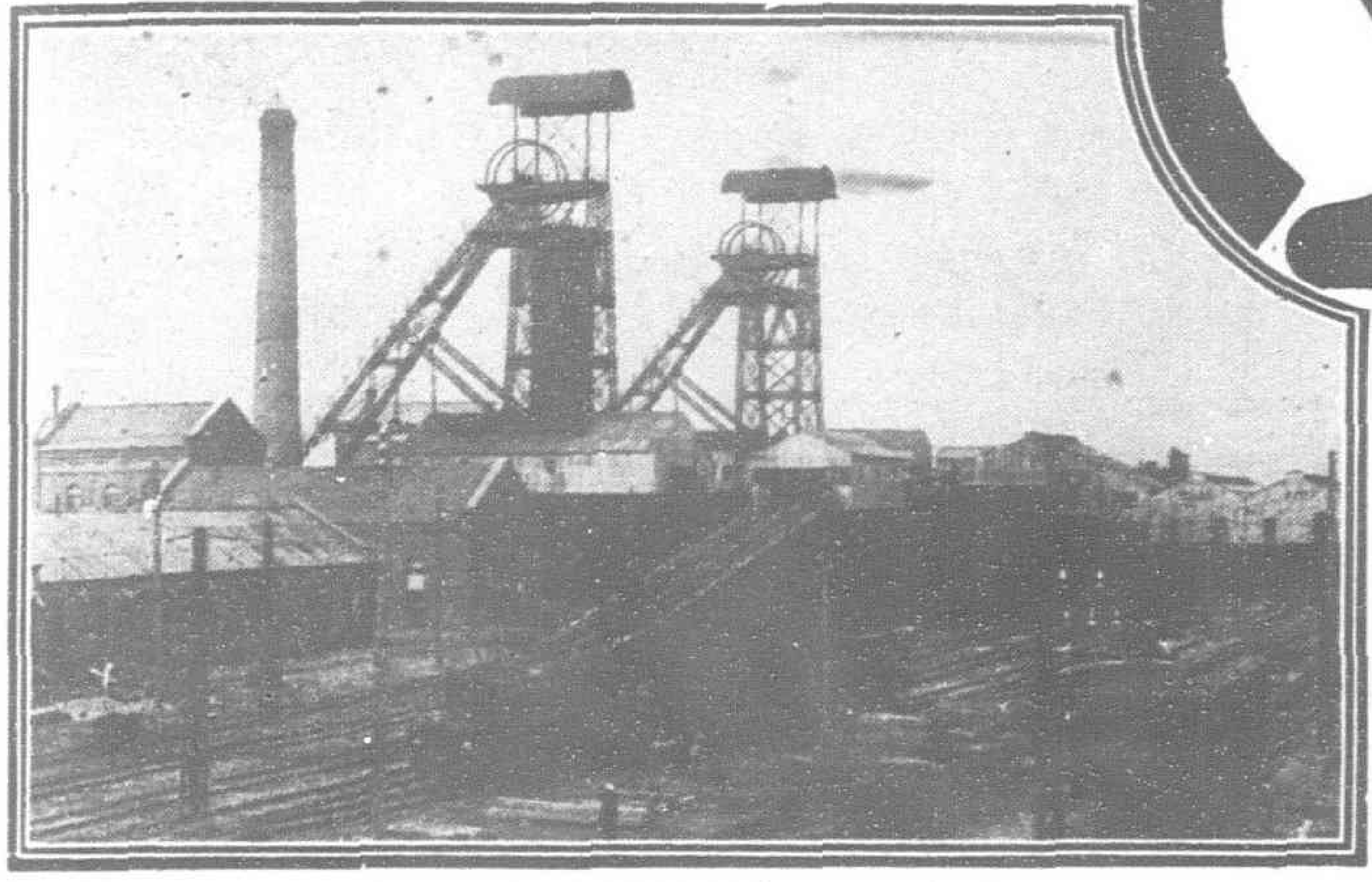

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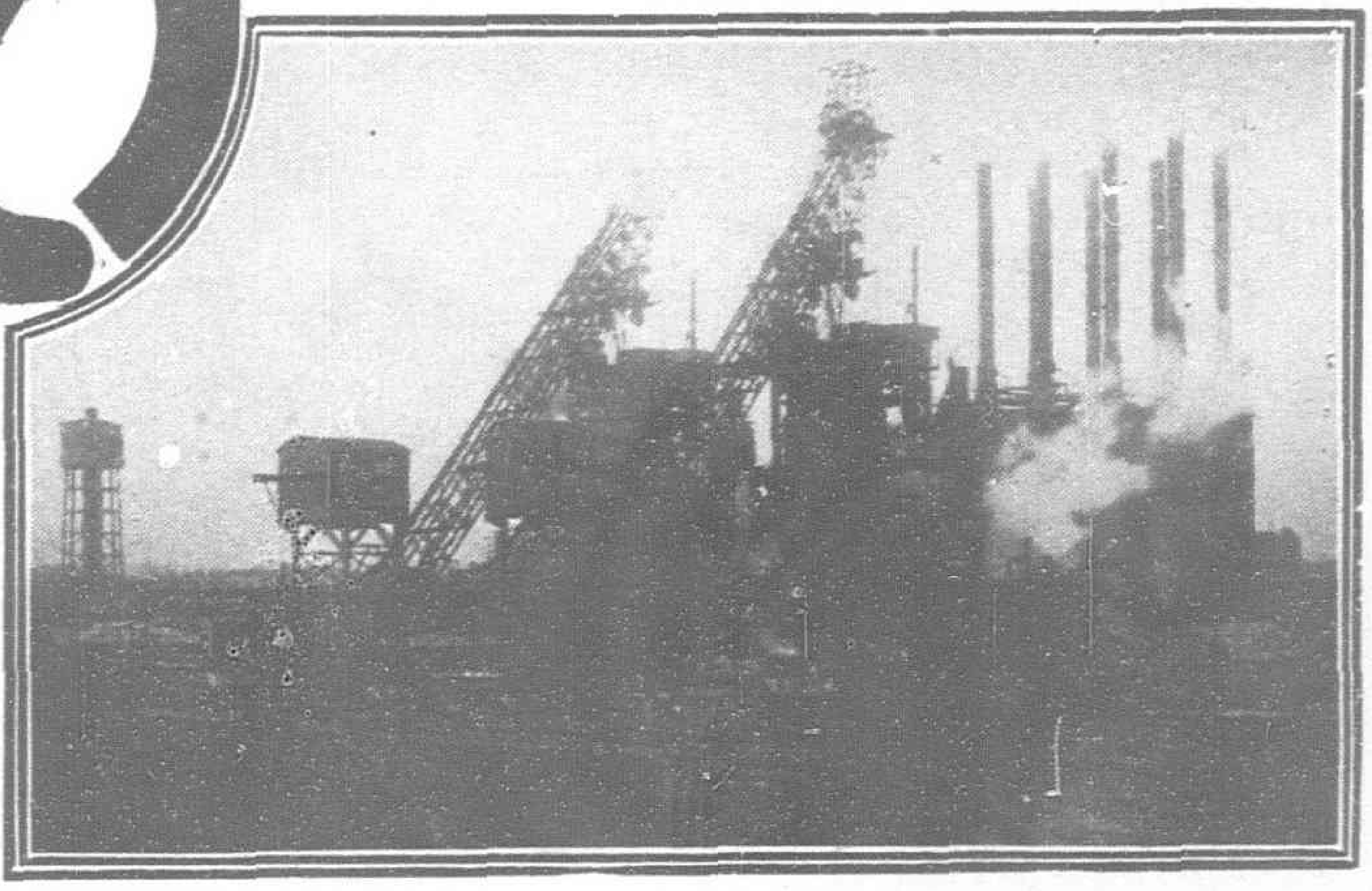

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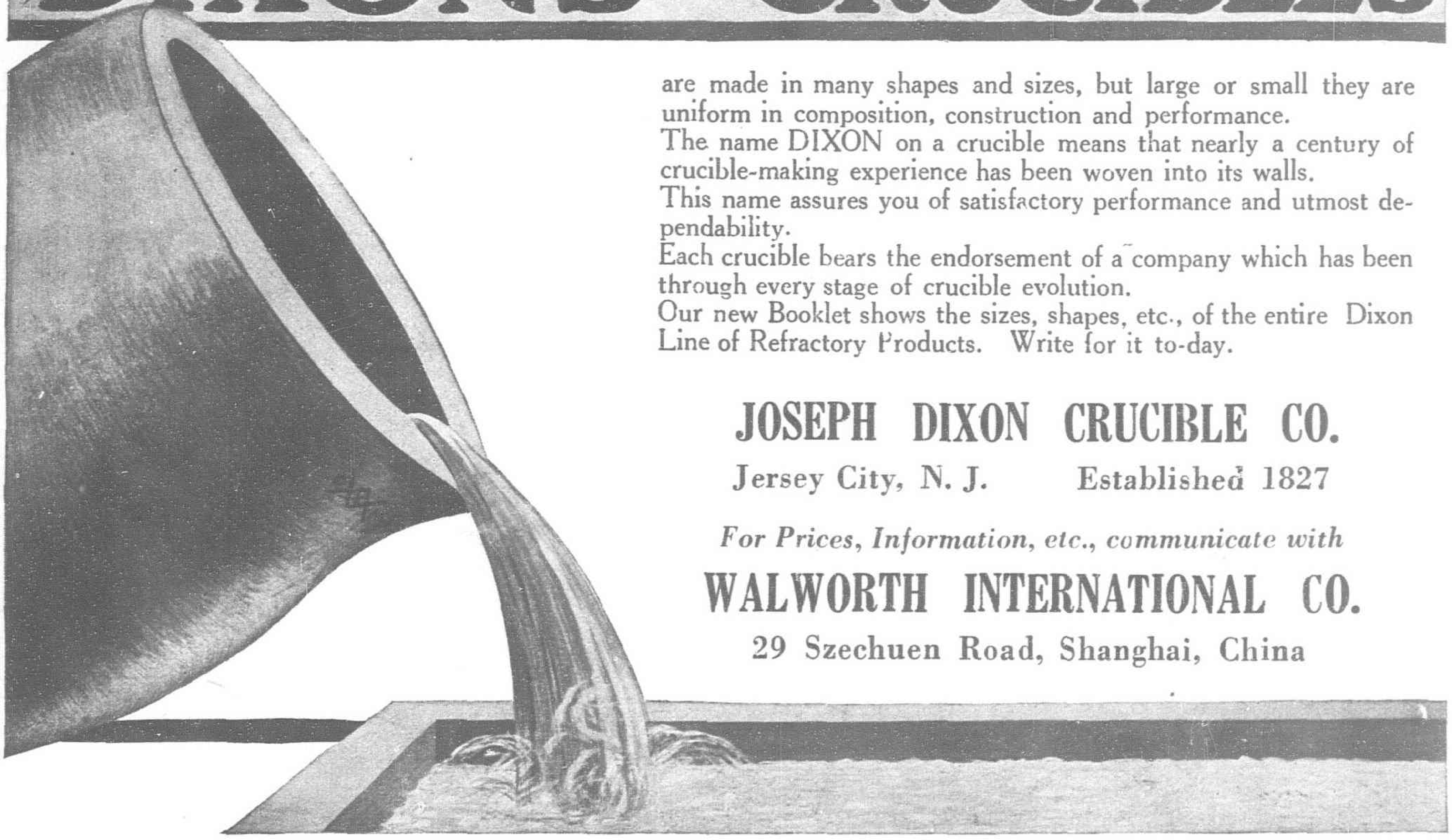

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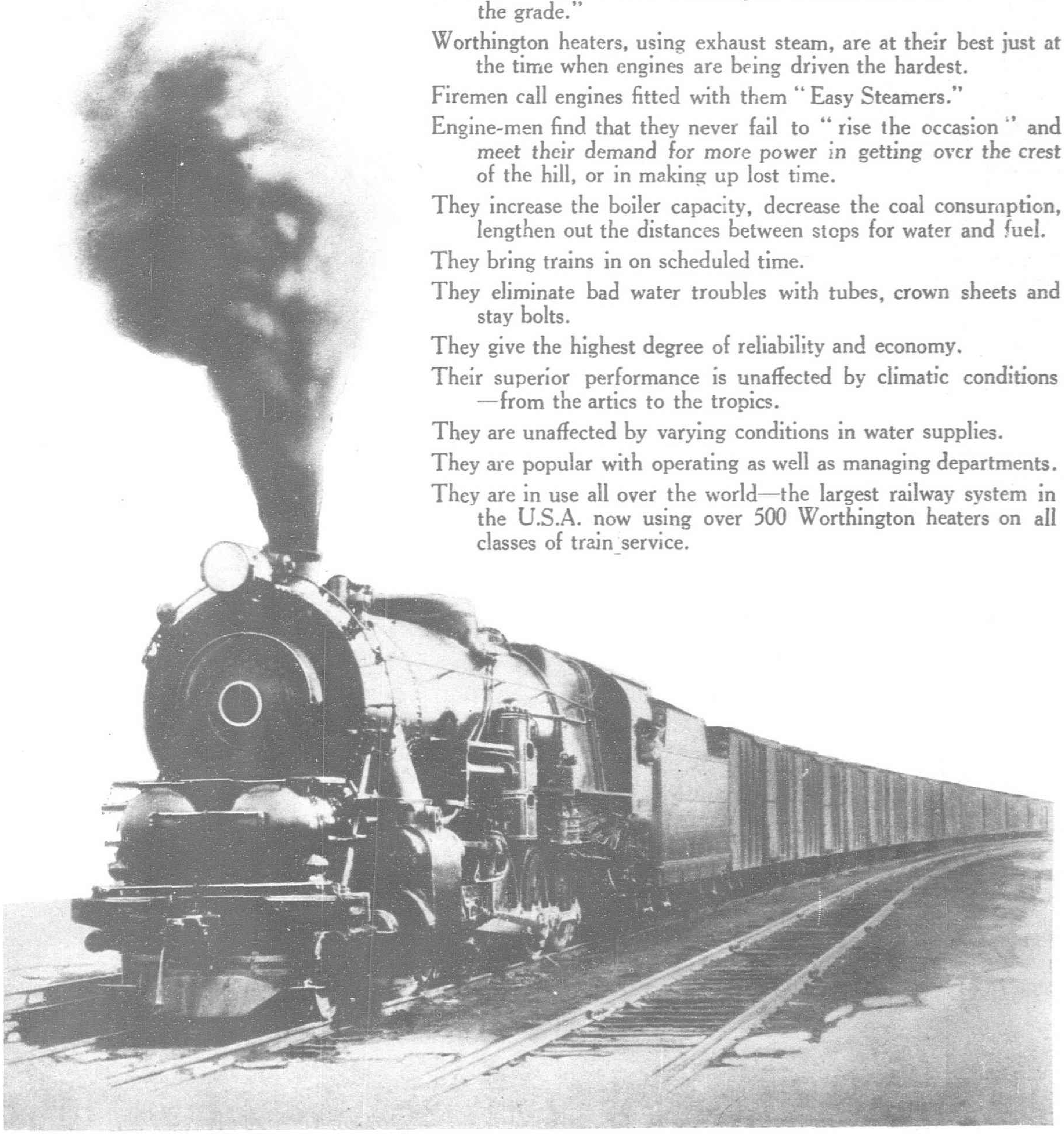

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Fig. W1—Elbow

Fig. W76—Flange

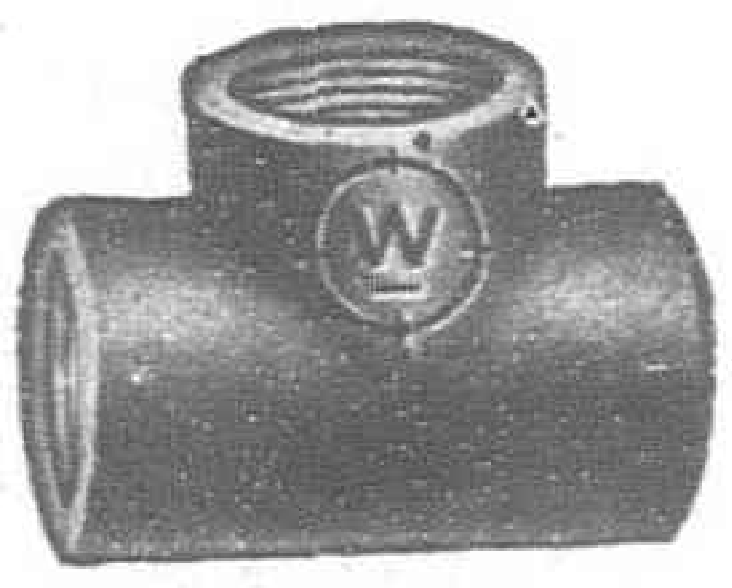

Fig. W13—Tee

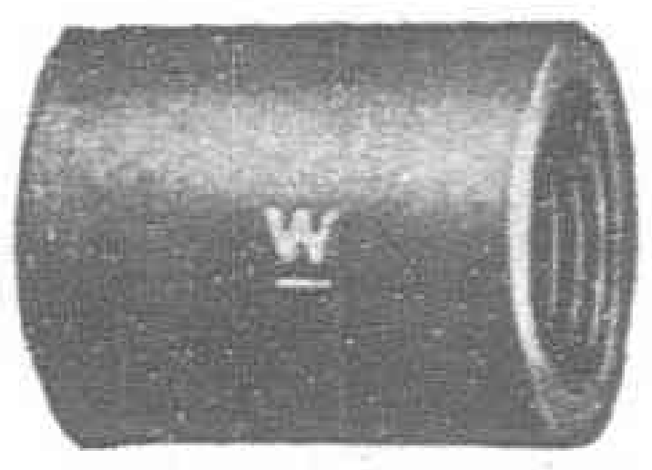

Fig. W33—Coupling

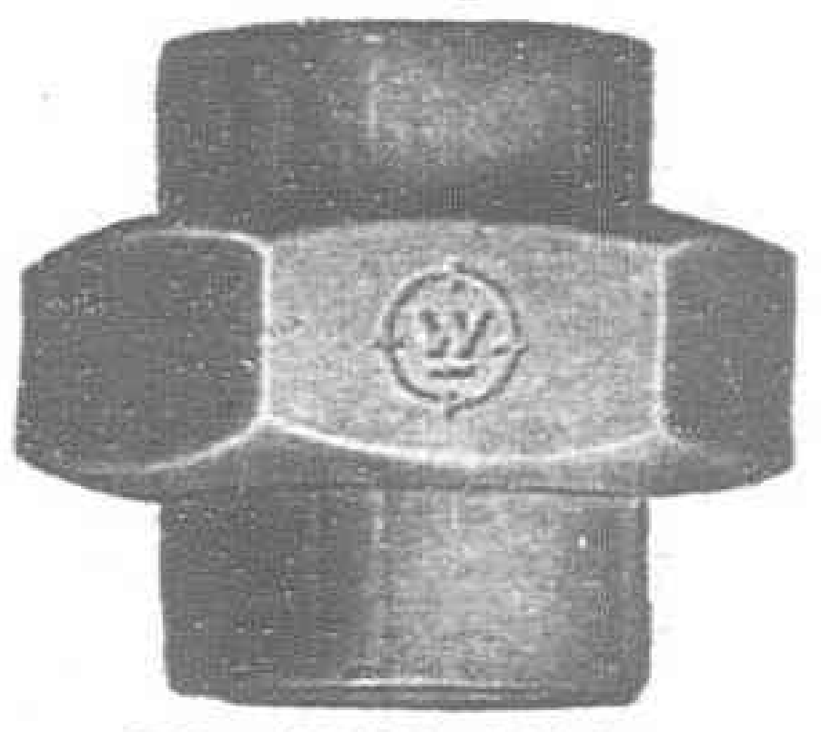

Fig. W46—Union

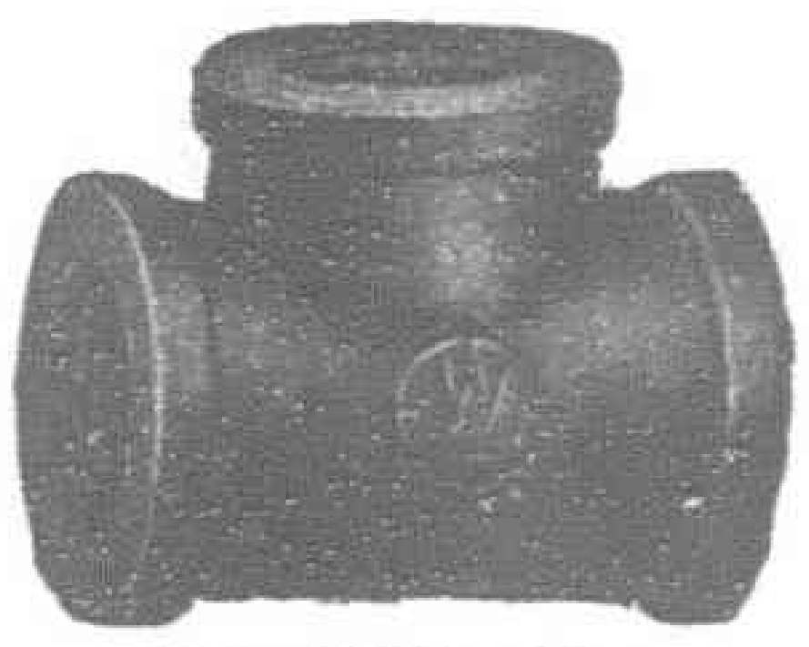

Fig. W14—Tee

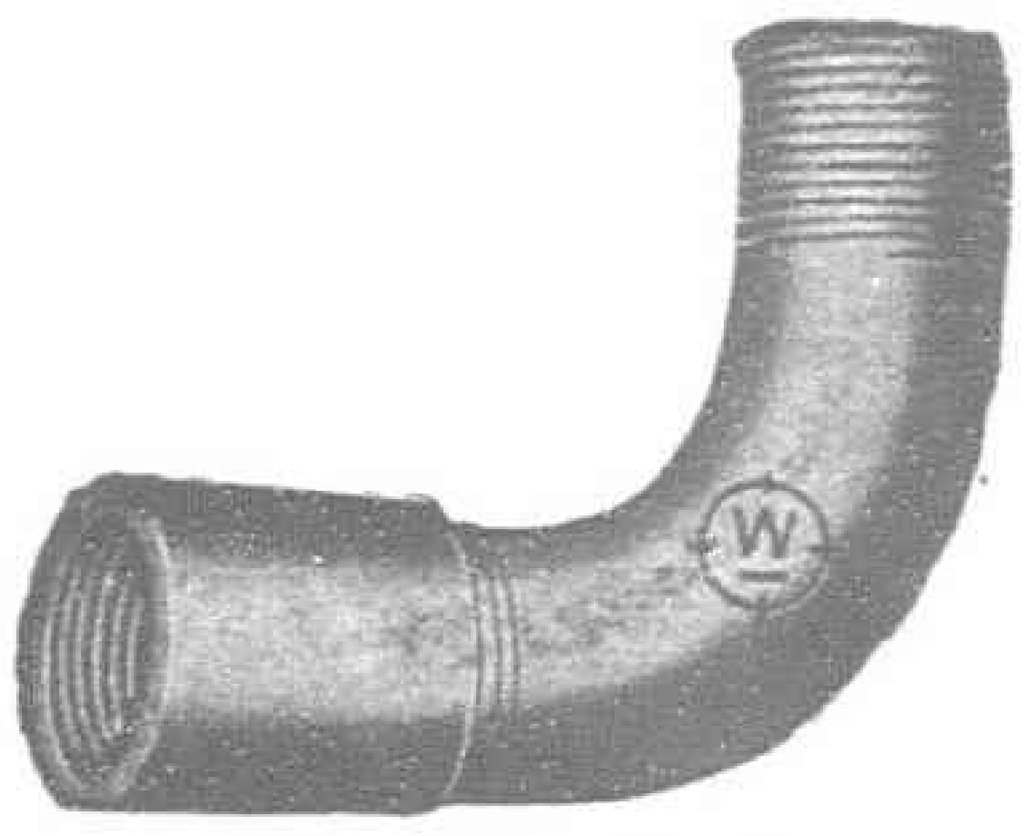

Fig. W21—Bend

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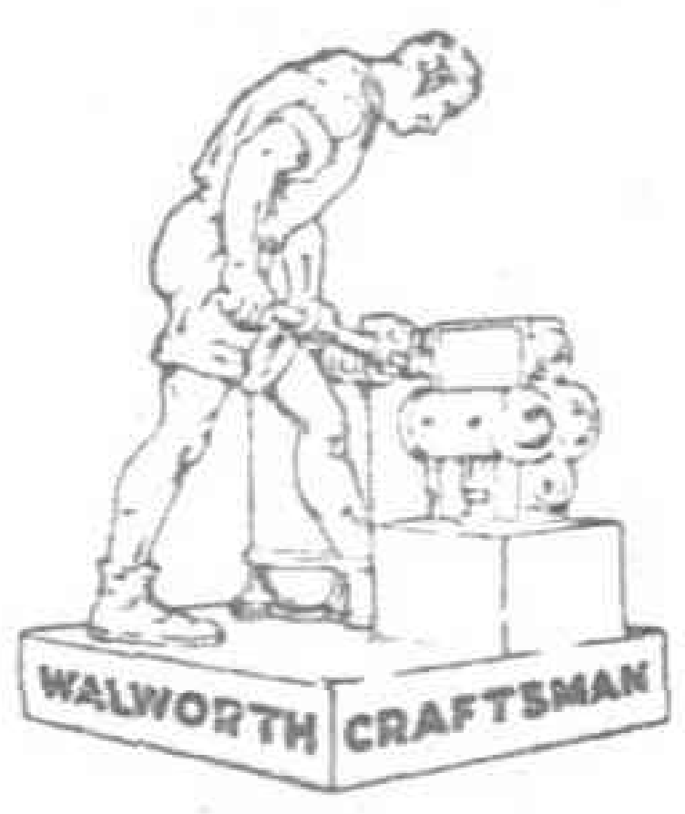

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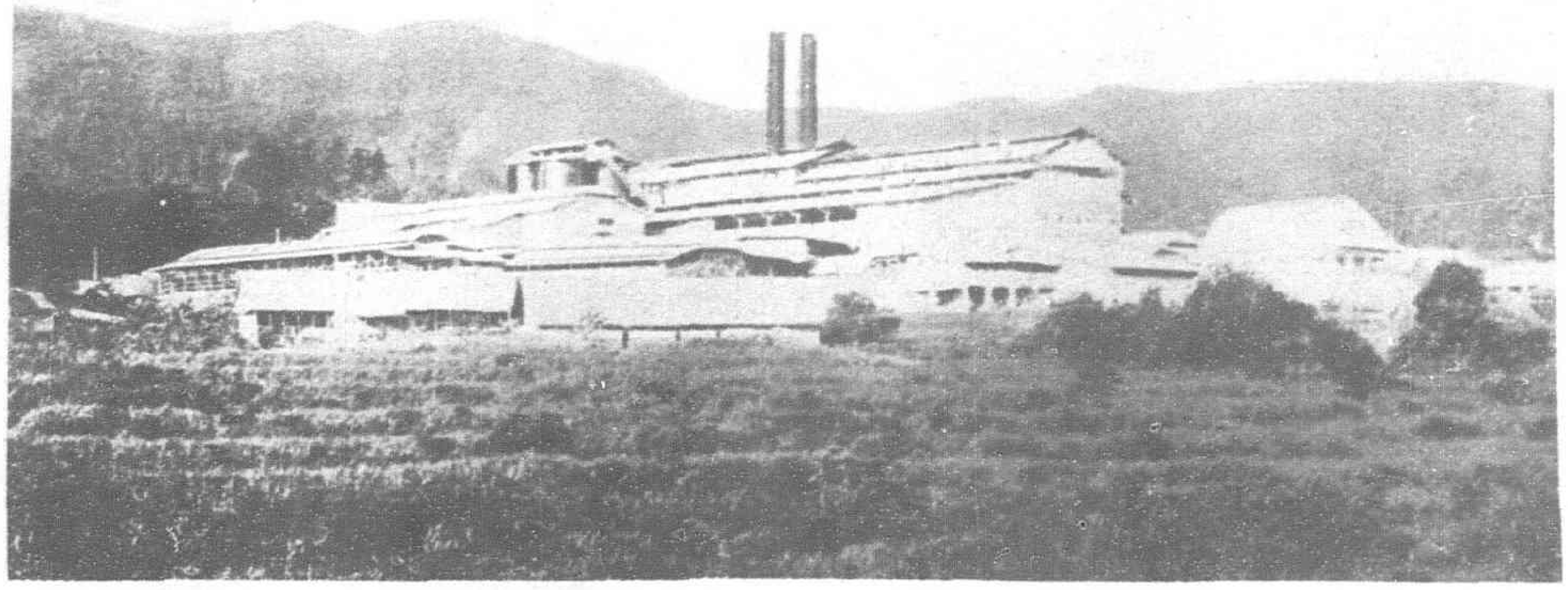

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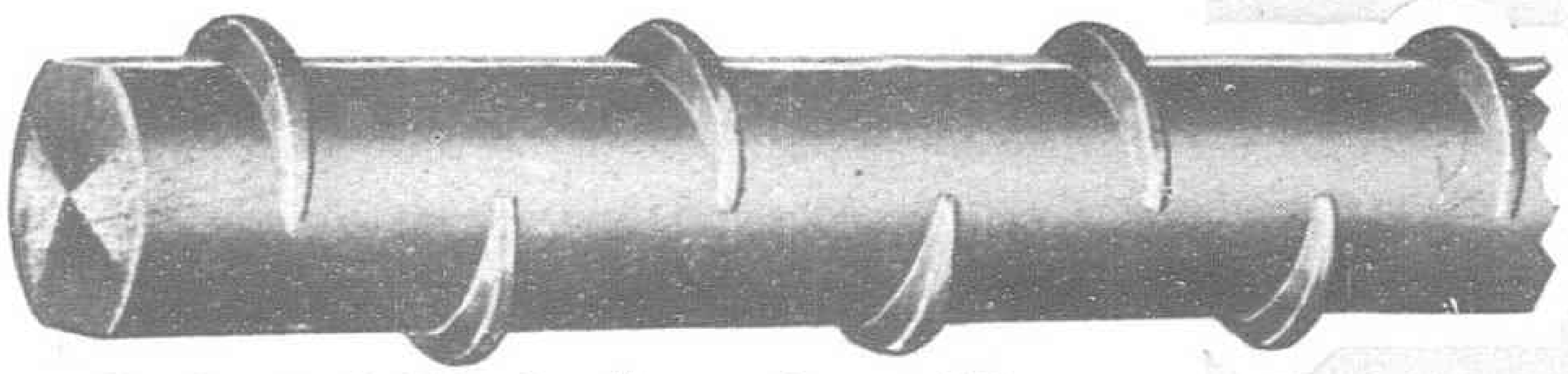

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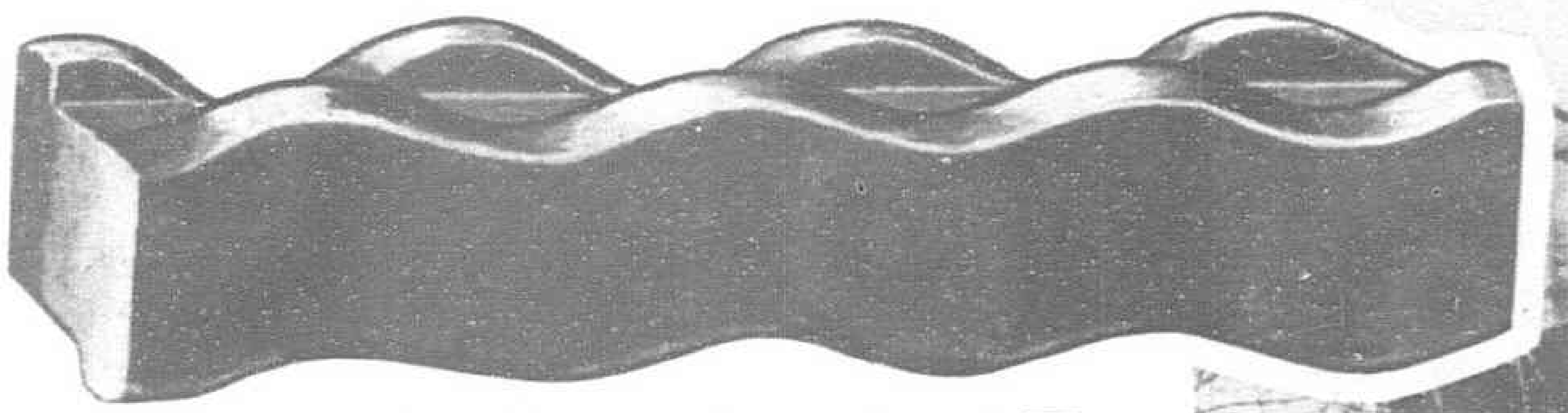

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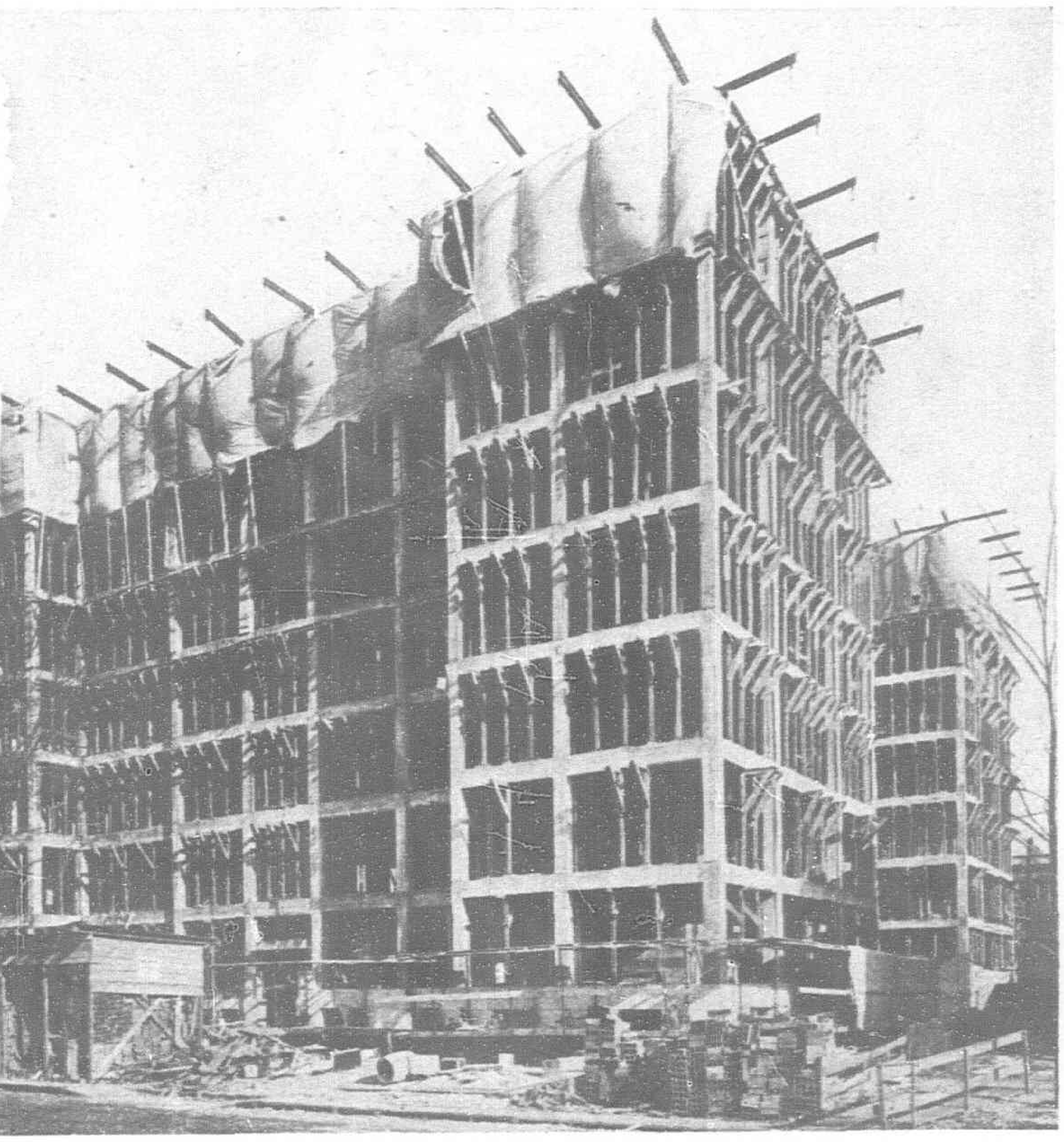

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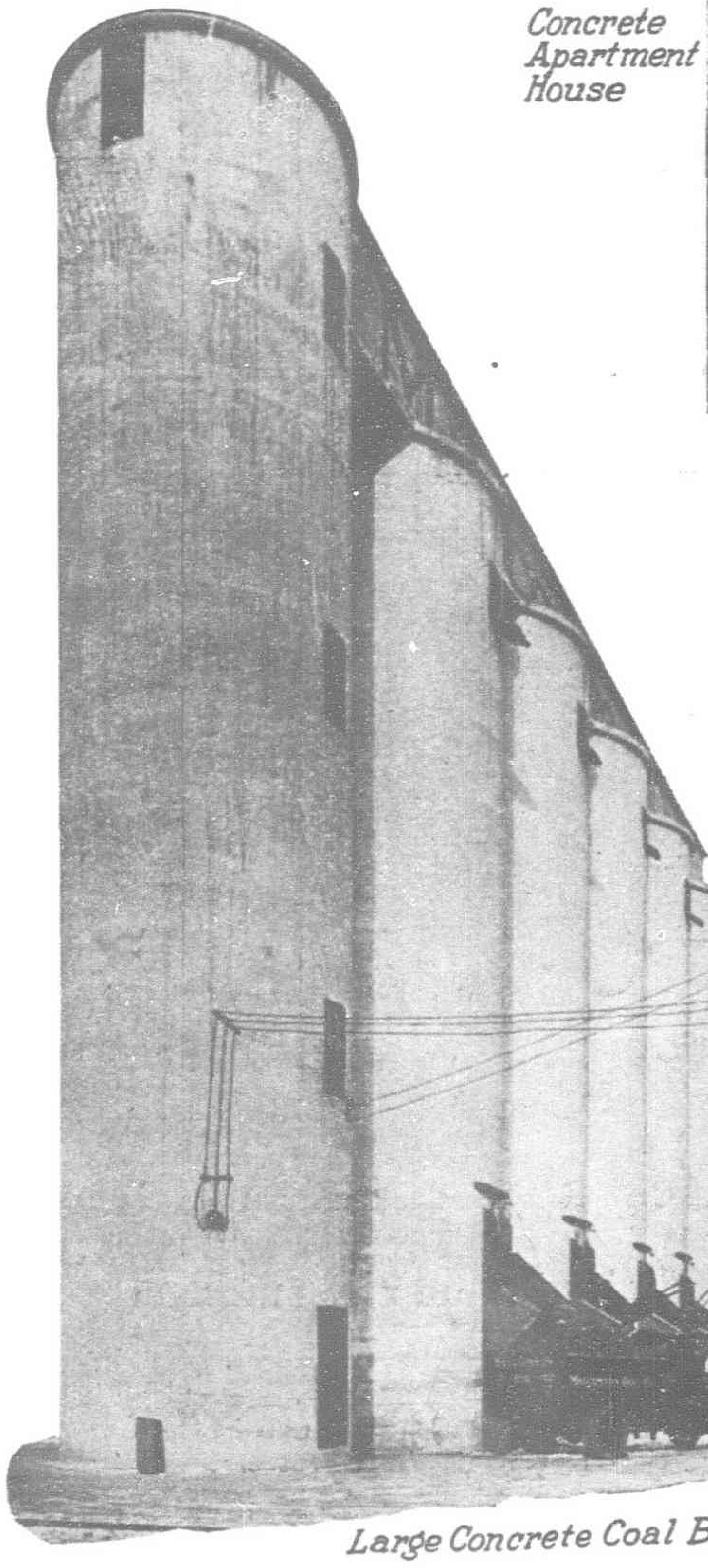

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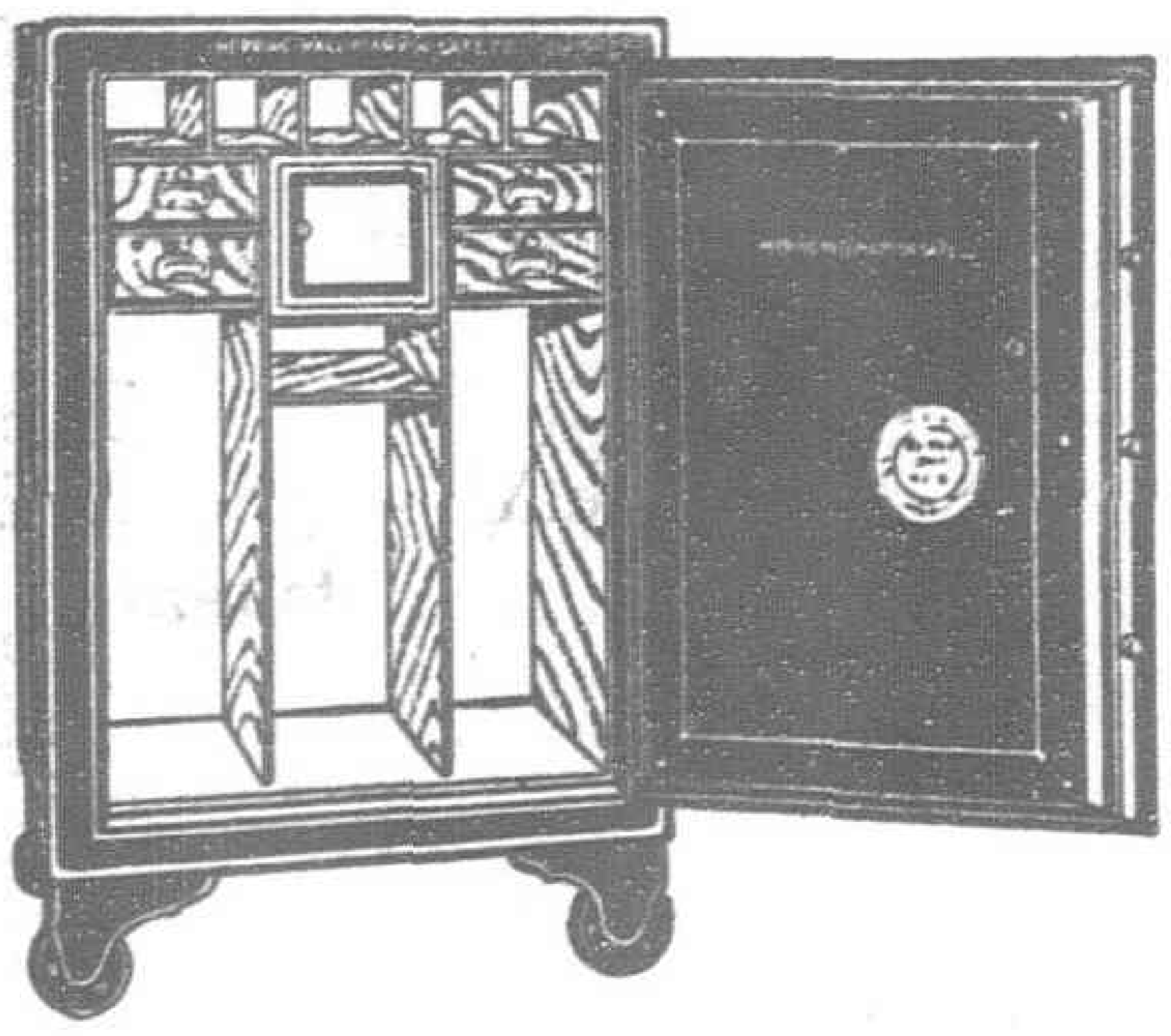

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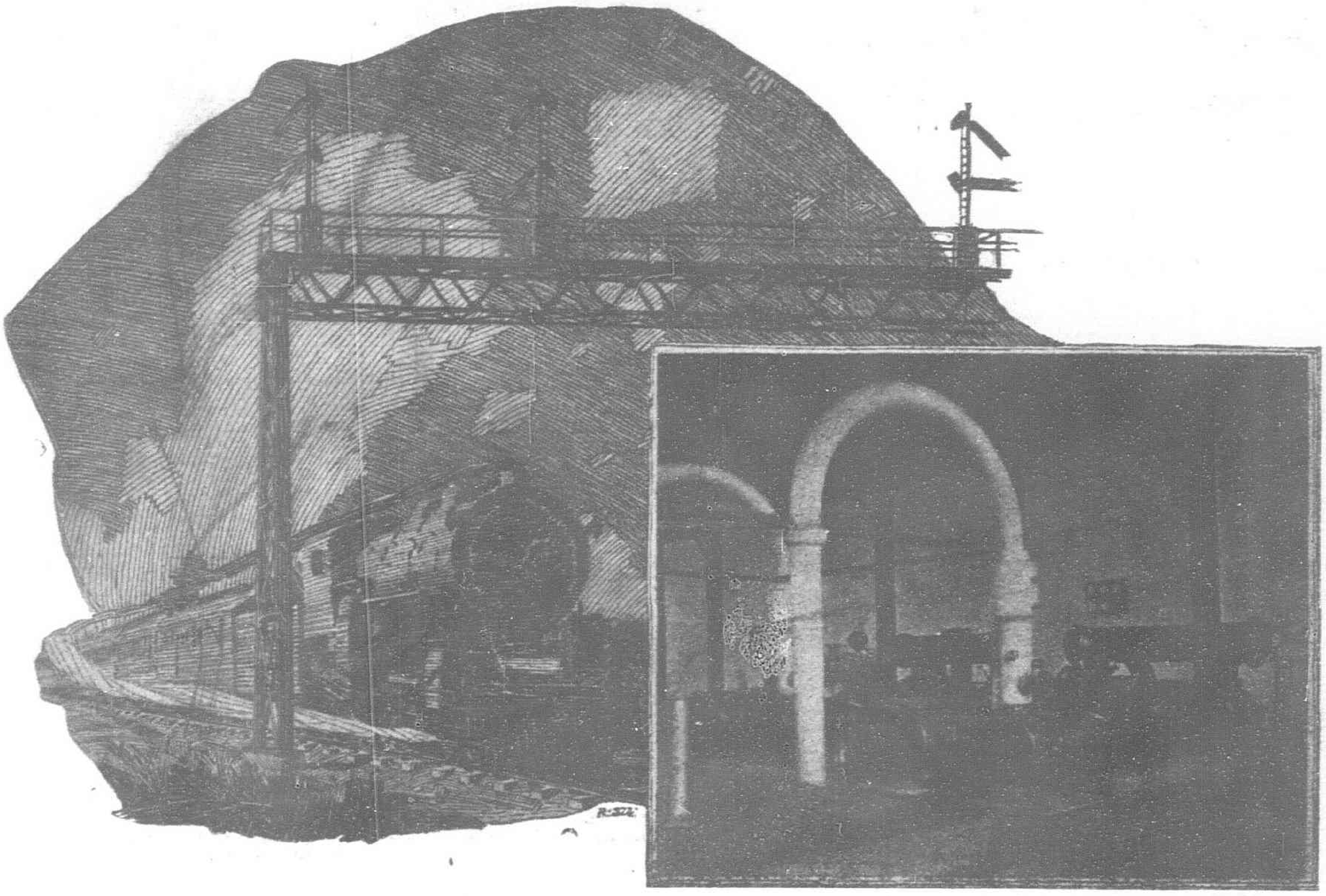

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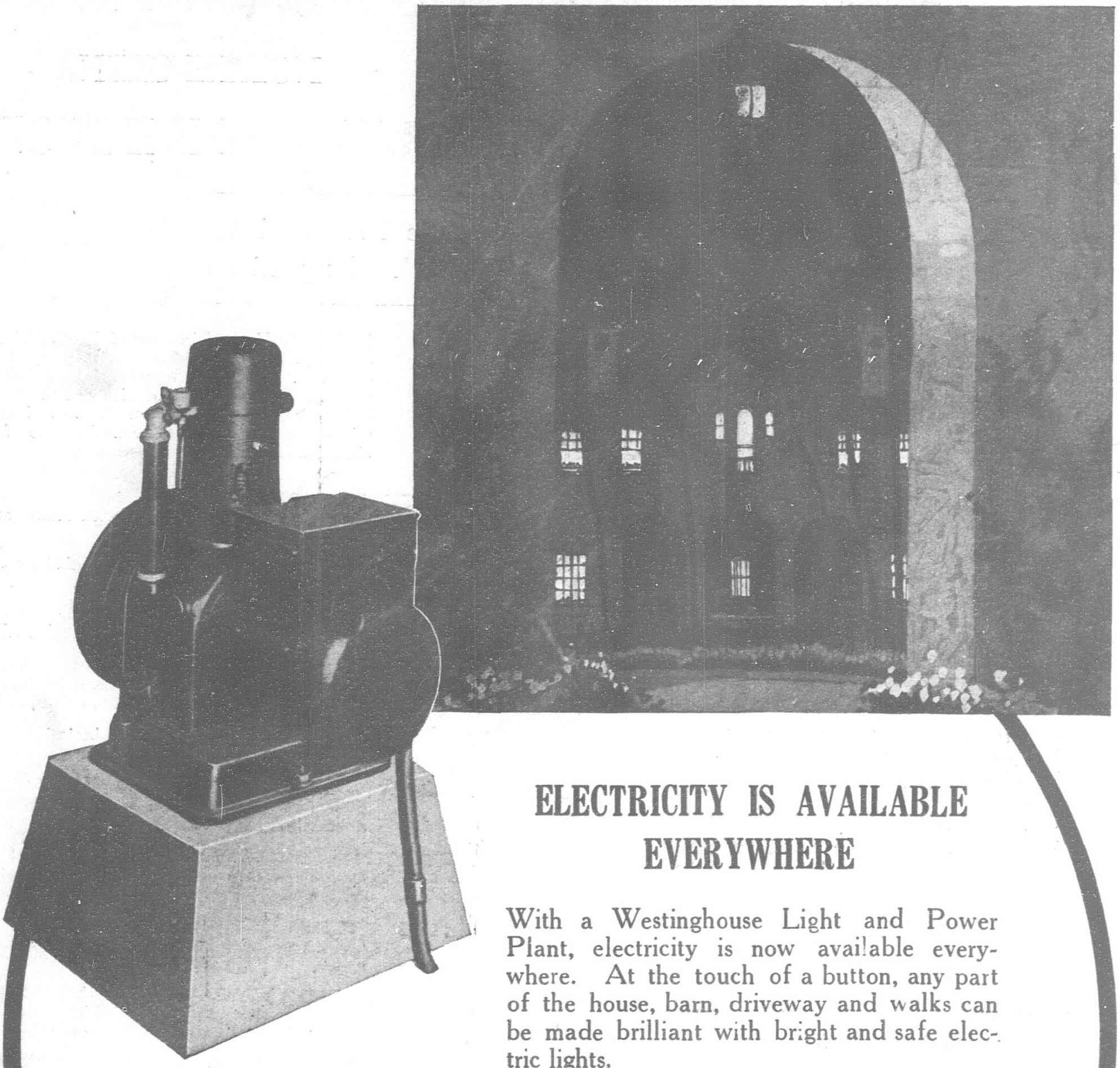

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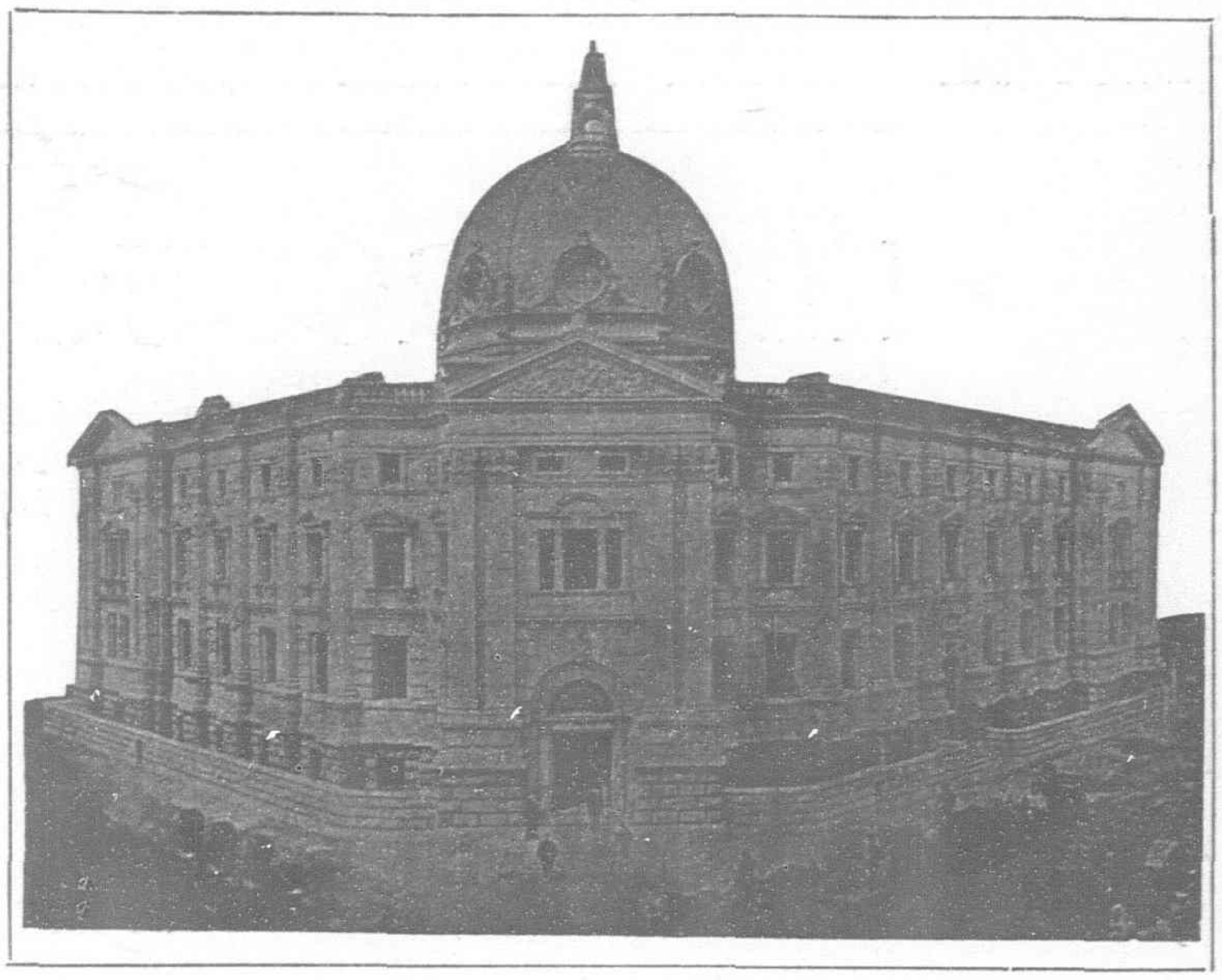

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The Far Eastern Review

ENGINEERING FINANCE COMMERCE

VOL. XXI SHANGHAI, JANUARY, 1925 No. 1

"UP CLOSE"

A Close-up Picture of the Great War Comedy Entitled "Slipping the Skids Under America" as Thrown on the Screen by "Upton Close" in "The Land of the Laughing Buddha" Published by G. P. Putnam's Sons

LITTLE by little the truth is coming to light concerning the origins of the great Japanese war scare of five years ago. Each new writer on Far Eastern affairs contributes evidence which reveals the existence of a wide-spread organized movement to railroad the United States into war with Japan over China. The facts connected with this movement were so clear that THE FAR EASTERN REVIEW several times called for a congressional investigation in order to open the eyes of the American people to the ramifications of a campaign which derived its impetus from a group of misguided fanatics holding office under the Wilson administration. The proofs which the American authorities were reluctant to face are now being retailed through the confessions and admissions of facts by various participants in the movement and it is only necessary at this time to sum up the evidence and arrive at a proper verdict. If the American people ever understand just how close they were to being plunged into war with Japan by this utterly irresponsible group working in close co-operation with propagandists and professional agitators in the pay of China and Germany they will appreciate how difficult was the task of averting a catastrophe which confronted President Harding when he came into power. In this, they will be assisted by the testimony of Mr. Josef Hall, who under the pen name of "Upton Close," contributes several missing links in a chain of evidence which only needs a few more facts to close the case.

The ramifications of the movement and the complete evidence upon which a verdict must rest are so scattered and voluminous that it would require a special book in itself to describe its workings. In order, however, to arrive at a full understanding of the value of Mr. Hall's testimony, it is necessary to invite attention to the high points of a campaign which culminated in the resignation of Dr. Paul S. Reinsch from the American diplomatic service in a letter to President Wilson demanding an immediate "show-down" with Japan, followed by his acceptance of the post of high-adviser to the Chinese government. With a minister at Peking imbued with pro-Chinese ideas, an organization was perfected in which the usefulness, loyalty and standing of Americans was measured by their readiness to espouse the cause of China.

Reinsch surrounded himself with men whose minds worked in harmony with his own; men obsessed with the idea that their country must fight Japan in order to save China. Long before the termination of the great war, preparations were made in Peking to indict Japan before the world as soon as peace was declared, evidence of which is seen in the activities of the Anglo-American Association of Peking and in their confidential literature handed out to every prominent American visitor. We have the confession of "Putnam Weale," a British adviser to the Chinese government, of the existence of a secret treaty of alliance between China and America providing amongst other things that China would hand over her ports and naval bases to the American fleet and keep the Japanese occupied in the Gulf of Chihli until the arrival of the American expeditionary forces.

The remarkable thing about this alliance, was that the American government, the American legation, American residents and American members of the Anglo-American association of Peking were maintained in the most profound ignorance of the part they were expected to play in this great war conspiracy. On the other hand, the inside facts were so fully known to a British adviser to the president of China that he was able to reveal even the text and detailed plan of campaign to the prime minister of Canada, publish them in his book and in a series of articles in a North-China daily newspaper without even a denial or challenge on the part of the American authorities or residents in Peking. This provided the Japanese government with the opportunity to request the American ambassador at Tokyo for an explanation. After cabling to Washington and making a categoric denial of America's knowledge of or participation in this secret war alliance, Ambassador Warren took the next train to Peking, where, we understand, he conveyed the sentiments of an outraged administration to interested parties.

Here we had a military and naval attaché tireless and ceaseless in uncovering every scrap of evidence that might convict Japan of aggressive designs upon China, yet right under their very nose they were being made the dupe of another group who had the plans of a campaign drawn up in advance for the benefit of the American army and navy in a war with Japan. The facts which have since come to light fully convict these men of gross partiality and inability to properly represent their country in such a grave crisis.

We have the evidence in the published reports of the Senate committee on foreign relations of Mr. Thomas F. Millard's efforts to break the Versailles peace treaty over the Shantung decision, in which he was aided by a group of Chinese who accompanied him from Paris for this particular purpose. We recall that he publicly declared that war with Japan was the only way to restore China's sovereignty over this territory. We also recall that this appeal echoed the sentiments of the chief Far Eastern expert of the American delegation to the peace conference, who exclaimed on learning of the Shantung decision, "This Means War"!

Just after America entered the war against Germany in 1917, Mr. Thomas F. Millard established a new weekly newspaper in Shanghai in which he was associated with Mr. J. B. Powell, who in due course became secretary of the American chamber of commerce of China, in full charge of its correspondence, official and otherwise. In fact, this representative body of American business men during and for two years after the war became an adjunct to *Millard's Review*, the most fanatically anti-Japanese newspaper ever printed.

While Mr. Millard was in Washington advocating war with Japan over Shantung, his associate, representing the American chamber of commerce, was sending circular letters to firms at home urging them to write to their congressmen and senators to demand from the state department the secret reports on Japan's activities in Shantung and have them read into the congressional record; a frank incentive to hostilities. The inference was that the chamber of commerce had full knowledge of the contents of these reports. The secretary of the American chamber of commerce at Tientsin also sent similar letters to American firms at home, stating in effect that only armed force could drive the Japanese out of Shantung; another open invitation for America to tackle the job.

The Far Eastern Review subsequently proved from the consular records that some of these reports were false and misleading and was able to correct the statement that Japan had discriminated against American trade in Shantung. All this is a matter of record. Now comes Mr. Josef Hall, who confesses that he was the investigator who for two years (1917-1919) journeyed through Shantung dressed in Chinese clothes and flooded the state department with reports about conditions in that province. Let us quote Mr. Hall (see page 31 of his book):

> **"Sometime previously I had decided that reams of reports filed in the state department would have less influence in saving Shantung to China than a few stories in American newspapers. I sent some articles secretly to my friend, J. B. Powell, editor of the Shanghai *Weekly Review*, the same Powell who was a prominent American captive in the kidnapping (Lincheng) case. Under the stories I put the words 'Up Close' as an indication of where I was. Powell ran them as the author's name under the title. They evolved into 'Upton Close' and the name has stuck to me since."**

Mr. Hall fails to enlighten his readers as to his connection with the state department or who authorized and sent him into the interior of Shantung to save the province for China. In the opening sentence of Chapter IV., Mr. Hall mentions the name of a Chinese friend and trusted fellow investigator thus revealing that others were colaborating with him, and that reports of Chinese investigators were being forwarded to our state department. We are assured, however, on the highest possible authority, that Mr. Hall was not an accredited agent of the state department, that the voluminous reports he refers to, were not only officious but a piece of downright impertinence, in which many Americans indulged as a patriotic pastime during the war. Now, if the state department did not employ Mr. Hall, who did? This is a pertinent question, for if Mr. Hall was not employed by the state department there is reason to believe that he was one of the volunteer agents of the military or naval intelligence service and that his confidential reports to these officials were duplicated in whole or in part to a newspaper whose publisher and editor were distinguishing themselves as leaders of the anti-Japanese campaign. Recalling the circular letter sent by the secretary of the American chamber of commerce in which the attention of American firms was called to the existence of these secret reports and Mr. Hall's admission that he was sending his stories through Mr. Powell, whose chief was at Washington agitating for war with Japan; recalling that the American minister at Peking was strongly urging President Wilson to provoke a "show-down" with Japan and that a secret Sino-American military alliance had been carefully drawn up in Peking in preparation for the conflict, the admission of Mr. Hall permits us to view a very clear close-up picture of the forces that were operating to precipitate a crisis.

There are other interesting revelations in Mr. Hall's contribution to recent Far Eastern history. The Lincheng train hold-up is still fresh in the memory of our readers. One of the kidnapped passengers was the same Mr. J. B. Powell, referred to above. Mr. Powell did his utmost through newspaper correspondence to connect the Japanese with the Shantung bandits, offering as proof of his accusation, the allegation that they were armed with rifles made in Japan and marked with Japanese characters. His co-worker, however, makes the following startling admission on page 20 of his new book:

> **"Most noticeably was this in the case of the famous train hold-up in Southern Shantung, which was not without its sardonic aspect. America took arms to Vladivostok to fight the Russians, then withdrew and left them in the care of the Japanese. A Japanese officer allowed 'White' partisans to ship the arms to Chang Tso-lin, independent ruler of Manchuria. He, in turn, desiring to embarrass the leaders south of the great wall who had recently defeated him. permitted a quantity of these good American rifles to be smuggled along the Shantung coast. Shantungese brigands used them to kidnap and rob American and other tourists!"**

In other words, Mr. Hall consigns his intimate friend to a very prominent place in the Annanias club. Yet is was on the strength of such conflicting testimony that the American people were prodded to a point where the Washington conference alone saved them from the horrors of an Asiatic war.

There are many other interesting revelations in Mr. Hall's book. The reader is left somewhat in doubt as to who really drove out the Anfu and Chang Tso-lin cabinets. The impression remains that although Wu Pei-fu was a great general he was fortunate in having Mr. Josef Hall as his chief of staff and adviser. At any rate it is now quite clear why Wu Pei-fu lost the recent war. "Up-Close," unwittingly perhaps, has performed a patriotic duty, making it possible for the intelligent public to get a close-up picture of a game that can never again be played in the life-time of this generation.

Notwithstanding Mr. Hall's confession of impartiality and admiration for Japan, there is nothing in his book to justify such an asseveration. Whatever the Japanese did was wrong. The book is replete with instances which prove this. Mr. Hall waxes wroth over the erection of a *yoshiwara* in Tsingtao but speaks rather nicely of the sing-song girls who travel on the Chinese railways to cheer the Chinese soldiers "without other pass than their long black braids." He goes into hysterics in describing how a Japanese officer beat a coolie with the flat of his sword, how the Japanese gendarmes took baked sweet potatoes from confectionary stores without paying for them and ogled the Chinese girls. He describes his adventures with the Japanese passport officer at Tsingtao, whose only offence as far as we can gather was his habit of sucking in his breath. Its a good thing for Japan that her officials in China did not take kindly to the favorite North-China vegetable, for had they done so and exhaled their breath on Mr. Hall, nothing could have stopped a war between their country and the United States. Hall lived up-close to the Shantung coolies for over two years and was immune to their garlic laden exhalations. He evidently liked it, but would never have stood it from the Japanese.

Mr. Hall very carefully refrains from enlightening his readers as to the results of his investigations in Shantung nor does he give us an insight into these wonderful reports filed with the state department, but he does give us the inside history of the salt rebellion in Shantung where the salt workers in a certain district armed with "Japanese" rifles closed up all the revenue agencies and chased the tax collectors out of the country. Like his co-worker, Mr. Powell, he jumps to the conclusion that possession by the Chinese of a rifle made in Japan is conclusive evidence that Japan is behind any movement in which such rifles are employed. He overlooks his former statement about the use of American-made rifles by the bandits who held-up the train at Lincheng. That was merely a "sardonic" coincidence. He also ignores the very important fact that the Japanese group in the consortium is equally interested with its partners in preserving intact this security for the reorganization loan. The following extract will indicate the curious working of Mr. Hall's mind:—

"I sent the story of the salt rebellion to the press. Then I traveled with Weston to Chefoo where he put the situation before his superior, a big-hearted but bluff Britisher named Pearson.

"My interview with this upholder of British prestige in Asia was one of the most interesting I have ever had. The first fifteen minutes Pearson did all the talking and all his words were bloody cuss-words. It was outrageous in his opinion for me to give publicity to an incident so damaging to the prestige of the foreign (British?) salt gabelle. And how, I asked him, after the torrent of abuse had run out, did he propose to meet the emergency?

"He had arranged for a Chinese war-ship to come and blow Gold Harbor, one of the largest native ports, into fragments as a warning to the Chinese people of the dangers of listening to Japanese seduction or holding out for the prerogatives given them by a mediæval emperor.

"The upshot of the matter was characteristic of the British genius in dealing with the Oriental.

"Gold Harbor was laid in ruins and armed resistance thoroughly suppressed. Then, with a hearty expression of appreciation for the honesty of the mistaken natives whom it had been necessary to subdue, the salt inspectorate royally offered the Shantungese salt makers a compromise. To-day there are none of its revenue more sure than those it derives from Shantung."

Note that the British official responsible for this crime against the Chinese people is described as "big-hearted, bluff individual characteristic of the genius of his countrymen in dealing with the Oriental." In no place in Mr. Hall's book does he produce any satisfactory or conclusive evidence that the Japanese mistreated the natives of Shantung, nothing that compares in sheer brutality and horror with blowing a town off the map because its inhabitants refused to surrender the rights of tax-emption conceded to them five centuries ago. Mr. Hall tells us their story.

"Far back in Chinese history," he says, "the throne got possession of the salt industry as its principal source of revenue. These men became in a sense the business assistants of the emperor, who levied a tariff on their output. About the time Columbus discovered America, a minister of state who had risen from poverty in Shantung through the civil service saved the career of a Ming emperor. Asked what he would have as a reward, he requested tariff immunity on the output of the Shantung salt-makers, so that the people of his native province might have cheap salt. This arrangement continued through the Ming dynasty and was respected by the alien Manchu dynasty which followed. Then came Yuan Shih-kai and his foreign loan, secured upon the imperial salt revenue. As a result, foreigners—largely Britons—were put in charge of the revenue collections. These men had no respect for the old Ming emperor's concessions. They were determined to enforce the impost equally upon all salt-producing regions."

And to do this, according to Mr. Hall, they blew a Chinese city off the map! As we transcribe the above story, our eyes wander to an illustration in the *Mid-Week Pictorial* of the *New York Times* of November 13, and rest on a ceremonious farce in which a bewigged judge is supervising the counting of six horse shoes in a London court, legal tender for rents of crown lands within the city which has been paid in this manner for 700 years! "The King's remembrancer," it is called, supposedly, in return for some favor to the king by the lessee of the lands. British justice recognizes the validity of this concession after all these centuries even at a great loss to the revenues of the city of London. Is it possible that this same broad sense of justice and honor as interpreted by a "bluff, big-hearted" British collector of the Chinese salt revenues, would take the form of blowing a Chinese port to pieces for insisting on the validity of a similar right?

Mr. Hall wrote his book to make out a case against Japan. Instead, he places the British community, the consortium and the salt-gabelle in a most embarrassing position. If his story of the salt rebellion is true, a grave injustice has been done to the Shantung salt-makers and justice demands that immediate amends be made by a restoration of their ancient privileges. The salt surplus is more than sufficient for the service of the reorganization loan and the remission of the Shantung taxes will not affect the value of the security. Is his story false? Then it is squarely up to the head of the salt-gabelle publicly to denounce it. It is equally incumbent upon the group leaders of the old consortium to clear themselves of any participation in such an outrage.

WHERE A HORSESHOE IS LEGAL TENDER: THE KING'S REMEMBRANCER.
Sir T. Willes Chitty Supervises the Counting of Six Horseshoes in the Law Courts in London, Rent for Grants of Crown Lands in the City Which Has Been Paid in this Manner for 700 Years.

It is just such incidents which have undermined foreign influence and prestige in China, consolidated the opposition of the Chinese people to any further foreign loan secured on revenues collected under foreign superivsion and provided leaders like Dr. Sun Yat-sen with the only platform that will unite the country under one leadership. We leave Mr. Josef Hall to the tender mercies of our British colleagues and pass on to another close-up picture of the same period.

G. B. R.

Spilling the Siberian Beans

Another Close-up Reel of the Great Japanese-American War Drama in which the Author and Hero gives to the World an Intimate Picture of the Anti-Japanese Movement in the Siberian Campaign

"Siberia's Untouched Treasure" by C. G. Fairfax Channing, D.S.C., Military Cross, etc.
Published by G. P. Putnam's Sons

AT the height of the anti-Japanese campaign of five years ago the Far East swarmed with American army officers and soldiers who had seen service in Siberia. The stories they told about the conduct of the Japanese troops and the cruelties practiced by them on their Bolshevist prisoners were seized upon and magnified by the war-mongers in order to further incite American hatred against Japan. We recall one of these stories which went the rounds until it became a classic. The story concerned the beheading of five Bolshevist prisoners by a Japanese army officer and the bayonetting of the bodies after decapitation. We heard this story from several different sources and when passing through Tsingtao in 1921, told it to Dr. Akiyama, the Japanese civil administrator at that port. Dr. Akiyama is one of Japan's foremost jurists and authorities on international law, the author of the military code which now governs her army. He was amazed, dumbfounded and indignant that such a story should be circulated. He requested the exact information that would identify the place, and the troops concerned in the execution, and said that if these were placed in his possession he would resign his post at Tsingtao, proceed to Tokyo and Siberia and not rest until the honor and good name of the Japanese army had been vindicated by the punishment of the guilty parties. It was impossible, however, to obtain the exact information at that time from those responsible for the circulation of the story.

The facts are now revealed in another new book, entitled "Siberia's Untouched Treasure" by C. G. Fairfax Channing, published by G. P. Putnam's Sons. Channing was an American army officer, who has evidently "spilled the beans" about the Siberian campaign. He describes the execution of these five Bolshevists prisoners and arraigns the Japanese nation as barbarous, vicious and uncivilized for the actions of one Japanese officer who played the part of executioner. His book is filled with the accounts and illustrations of Bolshevists atrocities and bears testimony to how hard it is to keep from beating them to death when captured.

To give way to such impulses is barbarous, but he thinks it is quite jolly and sportsmanlike to conceal one's bloodthirsty instincts behind the "*ley de fuga*."

"There is hardly a soldier in the ranks," Channing says, "who does not want to do away at once with an enemy he knows has killed one of his friends. To that soldier the sweetest words you can say are: 'Take this prisoner to gather some wood. If he attempts to escape, shoot him.' Soon off in the distance a shot will be heard—perhaps two—nothing more.' Then about dusk the soldier guardian of the prisoner will walk up, salute and report, 'Sir, that prisoner tried to escape.' That is all. Feigning sleep while the prisoner worked, the sentry waited for his quarry to turn and bolt. That is all he wants. *The rest is play and fun and is entirely within his rights and those of humanity, and is covered by international law.*" (The italics are ours.—Ed.)

Lieutenant Channing admits that the Bolshevists did the same with every Japanese they captured and the Japanese only retaliated by meting out similar treatment when the Bolshevists fell into their hands. Now it is just possible that the American soldiers in Siberia would have showered kindness upon their Bolshevist prisoners if the latter had coldly tortured and put to death every American prisoner taken by them. Again, it is just possible they would not. At any rate, it is difficult for us to draw a mental picture of such generosity, notwithstanding that we returned good for evil in the handling of German prisoners during the great war. Conditions were somewhat different in Siberia. The Japanese soldiers may "have looked upon their dead" as others before them have done, and with the same result. It is difficult to indict a nation for the acts of some of its soldiers sorely provoked by an unscrupulous enemy. It is still more difficult in the case of Japan to wipe out the wonderful record for chivalry established by its army in the Boxer troubles and in the war with Russia by accusing it of barbarity in a conflict where honor was conspicuous by its absence in the Red forces of Bolshevism.

We are noticing Mr. Channing's book at length as it is the first story by an American giving the inside facts about a campaign in which the American army was employed against the advice and wishes of President Wilson's highest military advisers. The book is replete with first hand testimony revealing the mental attitude of the average American soldier towards the Japanese. It is filled with glaring and unpardonable inconsistencies which help us to understand something of the mob psychology of an element whose stories were accepted by the people at home as international wisdom of a high order.

There is a special reason for inviting attention to this book at this time. In the early part of last month, three Americans, one of them an attaché of the embassy in Tokyo, were traveling on the night express from Tokyo to Kyoto. After dinner in the dining car they proceeded to match dollars to see who would pay for the repast and were told by the train attendants that gambling was not allowed. Whether they understood or not is beside the question, but at the next station they were unceremoniously bundled off the train with their baggage by the local police and kept in custody for several hours before being permitted to proceed on their journey. Naturally, these young gentlemen were highly indignant and as the story became known to the public, all foreigners in Japan and throughout the Far East sympathized with them.

Now the Japanese are avid readers of all new foreign books about their country. Mr. Channing's book devotes at least half of its pages to Japan and the Japanese army in Siberia. It arrived in Japan some time in October. Imagine the feelings of the Japanese reader when he comes to this passage on page 102-103:

"While many of the Japanese are very shrewd there are many whom the traveler encounters, entirely the contrary. On the trip from Shimonoseki to Kioto on the little toy-like railroad train, an American officer and I happened by accident to get into the private compartment of some royal dignitary, a prince as I remember; and as the coaches were rapidly filling we closed the door and prepared ourselves for a very enjoyable journey through the terraced farm country of the island. After a few miles a young-looking train attendant discovered our presence in his highness' coupé and began a rapid but meek series of expostulations which, although it all went over our heads, we understood to mean:

"'You must not ride here, please, because this is only for my, or rather his highness, the 'so-and-so-of-such-and-such." I happened to have bought a Japanese dictionary of self-instruction and conversation with the expressions needed by the traveler, and being reluctant to give up our illegal possession of his highness' comfortable cushions I took it out and began asking him funny questions from its pages while my partner in the crime began to give him choice cigarettes and spearmint gum to chew. This gave me time to look up the next remark to spring. I asking him, 'Are your ears cold?' 'Press the button and drinking water comes from the pipe.' 'Is your wife in America now?' At these he laughed and closed the door lest the train conductor see him hobnobbing with us on forbidden ground. After a few moments he gave us up as rocks and left us to our comfort. Luckily, at the next station we reached out of the window and bought some fruit and some of the tasteless Japanese candy; for as soon as the train started again in walked the conductor and the boy together. We said to each other: 'Lay on McDuff,' and started the same tactics again, with similar success. Not, however, before we had led them into an undignified game in which the four of us sat on one side of the compartment and snapped orange pits across at a picture of the Mikado on the opposite wall. We let the zealous little fellows excel us in this strange marksmanship. Finally we were given up by the two natives as immovable, and they surrendered the compartment to us. Later in the day two other sight-seeing Americans—secretaries at the embassy in Tokio—boarded the train and spying us in the ultra-first-class coupé asked laughingly: 'How low must we bow before entering here?' We assured them that we had joined the crowned family only for the trip and that we had left all our bodyguard behind so that it was safe for them to come in. We finished the trip with a card game and tiffin in the dining-car at which I, not relishing the rice *a la nicotine*, partook of several pieces of fruit from the heaping bowl; at which the attendant threw up his hands in horror and, counting the tangerine peelings, charged me five *sen* (two and one-half cents) for every piece of fruit over one that I had taken."

"At every station the entire populace bowed to the royal coat of arms on the side of our car; and then when they saw our American faces appear at the windows instead of their prince they fell back in disappointment."

Had this happened in any other country but Japan the gay young army officer and his companions would have been ejected bodily from the car, yet Lt. Channing seizes on this characteristic exhibition of Japanese courtesy as an opportunity to lampoon and insult them. Now the Japanese may not all understand English, but they are not fools. That Mr. Channing and his friends were permitted to outrage all their finer sensibilities, insult their emperor and get away with it, was due solely to the fact that they were American army officers. Even the Chinese would never have stood for this flagrant abuse of traffic regulations and insult to their rulers. The Japanese had just about finished reading this book and given the necessary instructions to their railway police when the young man from the American embassy and his friends started their dollar matching game on the Tokyo-Kyoto express. They have no kick coming to them. The wonder is that they were not punished to the full extent of Japanese law. That they were liberated as soon as their identity became known is one more proof of Japanese courtesy and friendliness towards the people of the United States.

The British Boxer Indemnity

The federation of British industries has once more invited the attention of the secretary of state for foreign affairs to the need for industrial representation on the committee appointed to consider the objects to be financed out of the Boxer indemnity payments. The letter, which is signed by Sir Eric Geddes, president of the federation after, directing attention to previous correspondence regarding the constitution of the committee, continues as follows:—

"I need hardly say that the federation were keenly disappointed at the decision reached by Mr. J. Ramsay MacDonald that industrial interests should not be represented on this committee, more particularly in view of the definite assurance previously made by the Marquis Curzon of Kedleston in his letter to the federation of 16th May, 1923.

"The federation feel most strongly that the question of the application of these funds is directly of the greatest importance to industry in this country, and they cannot help feeling that the committee provided for in the China indemnity bill, as amended by the late government, is not sufficiently representative of all the important interests involved to give adequate and impartial consideration to the various schemes which will doubtless be put forward for the allocation of these funds. Moreover, there exists, in the opinion of the federation, a serious danger that a committee including two representatives of education without the presence of representatives of other important interests would tend to prejudice the important questions of principle involved in the allocation of the funds.

"The federation attach the greatest importance to the desirability of the committee being able to give the fullest consideration to all suggestions which may be put forward, whether educational or otherwise, and they maintain that such consideration cannot be given except by a committee on which industry and commerce are adequately represented.

"I sincerely trust, therefore, that you will see your way to reconsider the decision reached by your predecessor, and will make the necessary provision for the representation of industrial interests on the committee, in accordance with the original intention indicated in the Marquis Curzon's letter."

* * *

A "Dawes Plan" for China

Another Blunder

It was a foregone conclusion that the proposal of a "Dawes Plan" for straightening out the finances of China would be rejected by the Chinese government and meet with the disapproval of the consortium. As soon as a government comes into power which holds out some promise of stability and some prospect of paying its obligations there will be no difficulty in devising a practical plan to place China on a satisfactory financial basis. The situation was summed up tritely two years ago by one of the group leaders in the following words: "If the Chinese would only stand still long enough, we might find as security that would justify us in lending them some money, but just as soon as we have a plan all figured out and are ready to slip a few millions into their pockets, a new crowd edges its way in between and with hands outstretched demand that the coin be paid over to them." This situation has not changed. It is chronic. There is nothing therefore to get excited about and a committee of business men would only make a bad matter ten times worse. The proposal which has received so much publicity loses sight of the following facts.

At the Paris peace conference, a new financial consortium was created for the purpose of assisting China to get on her feet. With the exception of the American delegates, the representatives of the other groups were experts in Chinese finance, contributing their store of accumulated knowledge to the American chairman in order that the new venture might work out for the benefit of all concerned. Conditions in China were chaotic. There was no government worthy the name. Every available and conceivable source of revenue had been hypothecated. China was bankrupt. As most of the bonds would have to be floated on the American market, the chairman of the consortium after careful consideration, selected the best bond lawyer in the United States to represent the group in Peking. He was instructed to make an exhaustive survey of conditions in co-operation with the other group representatives and in the event any honorable way could be found to lend money to China, to devise an iron-clad bond that could be sold to the American investor. This gentleman, Mr. Frederick Stevens, duly arrived in Peking, where it did not take long to ascertain that a Chinese loan could not be offered to the investing public without committing a crime that would have permanently ruined the standing of the issueing banks and landed the group leaders in a federal jail. Mr. Stevens, therefore, sat tight, waiting for a turn of the political wheel which might have provided an opening for the consortium to discharge its functions. All this time he was besieged by interested parties with inpossible loan schemes, until it became necessary for him to practically withdraw from the social life of the capital in order to escape their importunities. When these loan promotors finally understood they could not influence this uncompromising guardiam of the national honor, they resorted to innuendo and billingsgate in order to discredit him.

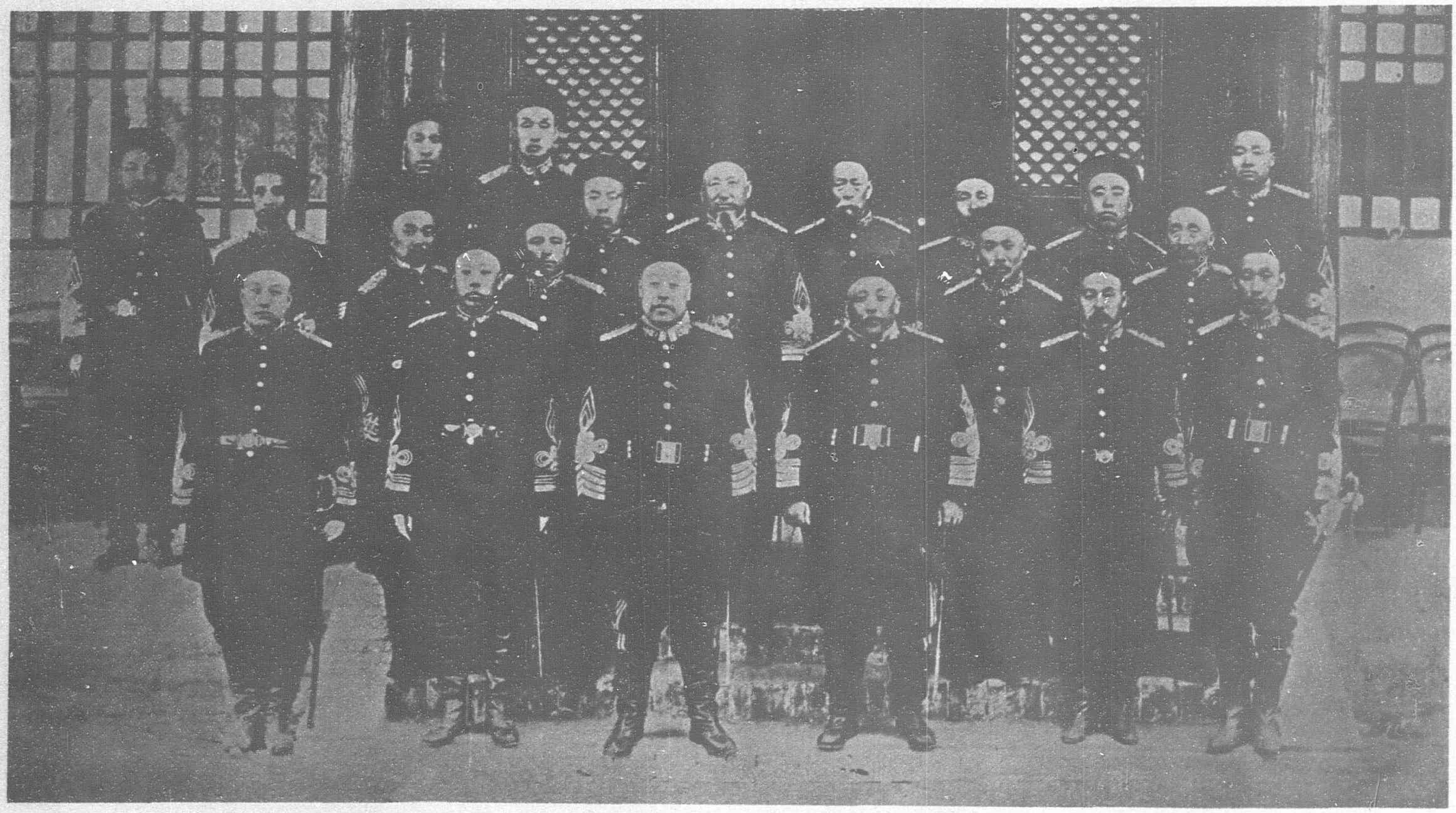
Americans had loaned money to China without security and for no particular purpose. American merchants had sold millions of dollars worth of materials to the Chinese government and could not collect. Some of these men, not all, faced serious financial difficulties as a result of China's lapse from honesty. In the main, they were willing to endorse any plan that would transfer this load to the pockets of the investor, forgetting that the nationals of other countries represented in the consortium were equally entitled to some sort of settlement of their just claims against the Chinese government. Faithful to his trust and loyal to his colleagues in the other groups, Mr. Stevens rejected all loan proposals pending unification of the country and the reorganization of China's finances under guarantees that all outstanding indebtedness would be taken care of. A campaign was then started to eliminate him and hand over the American leadership in China to others.

Other foreign commericial communities in China accept the heads of their respective financial groups as their leaders in all matters connected with finance. Americans alone refused to accept such leadership. Greater than Mr. Frederick Stevens, greater than J. P. Morgan & Company and the thirty-seven banks in the American group, greater even than the state department who created this instrument to carry out its policies in China, stood a little group determined to run things their own way. If J. P. Morgan & Company and the group refused to accept its leadership "pressure must be brought to bear to compel them to modify their viewpoint." American financiers were publicly advised to ignore the consortium and enter into independent negotiations with the Peking government. The self-imposed leaders of American interests in China determined to ignore the usual channels of communicating with the state department by going over the heads of the legation and consulates and appealing direct to congress and the public. Something happened about that time. For nearly a year there has been no further attempt to dictate the Far Eastern policy of the American government from the outside until the success of the Dawes plan for financing Germany provided an opening for advocating the application of a similar remedy to China.

It is immaterial who originated this idea. It is only necessary to point out that after using all the strength of its diplomacy and the financial power of the nation to create the consortium, the state department could not with honor or propriety make it lose face by requesting a body of business men to draw up a plan for it to work to, especially at the very time when its experts were actively engaged on the same task. For over a year the consortium has been conducting a most careful survey of China's indebtedness and her general financial and political condition on order to be prepared to carry out the object of its existence as soon as conditions are favorable. This report is nearly completed and will be in the hands of the group bankers within the month.

It is entirely natural that China's American creditors should make every legitimate effort to have their claims settled. They have carried the load a long time with little prospect of being relieved. So have the nationals of ther countries whose legitimate claims against the Chinese government have also been ignored and in some cases repudiated. The consortium was called into being by the American government for just such a situation. It cannot set aside this instrument without destroying its own prestige not only in China but with its three partners. In suggesting a scheme that relegates the consortium to a back seat, somebody blundered.

The Root of all the Trouble



THE ORIGINAL PEI YANG ARMY CHIEFS. PHOTOGRAPH TAKEN IN 1907

Front Row, from left to right: Colonel Yen Tun-yuan; Colonel Chao Chung-san; Tieh Liang, War Minister (only photo of the War Minister in Foreign Uniform); Yuan Shih-kai, Commander-in-Chief; General Feng Kuo-chang; General Wang.
Middle, from left to right: Surgeon-General Hsu Hua-ching, Director of Peiyang Army Medical College; Paymaster-General Lu, Director of Peiyang Treasury; General FengYu-mun; Colonel Lo Lang-tsai; General Tien Tsung-yu; General Hsu Kou-chung; General Sha Sin-yu; General Tuan Chih-kuei; General Tuan Chi-jiu; Colonel Chun Hsu-feng: General Ma Ling-piao.
Back, from left to right: Pan Ching-san; Colonel Yun Yu-tsun; Brigadier-General Chang Huai-chih

CHINESE politics can concern the foreigner only from two standpoints : first, in this period of the aftermath of the European war, it is unfortunate that the international relations of the whole world are further complicated by the altogether unwarranted disorders in China ; secondly, because the disorders here result in a stoppage of the modernization of the means of production and distribution of commodities, which means that trade relations and financial co-operation on a large scale between China and the industrial nations are impeded.

In both instances, more harm is done to China than to the foreign nations. For, when the officials of China conduct themselves like so many children in a gang fight, the rest of the world at first looks on somewhat amused and afterwards turns away in disgust. No one can afford the time or expense of helping to bring order to China. The great powers are too concerned with more vital questions to give this secondary problem any consideration. As for the stoppage of development enterprises, which has resulted in the boycotting of China by the financial markets of the world, big business naturally suffers a certain loss, but China suffers more, for her credit is impaired, her good name as a customer is lost, the possibilities for the future are not bright. At this moment China could not borrow a dollar even for a first-class proposition on any market without an intermediary such as the consortium guaranteeing the account, which is disgraceful for a nation of the size and wealth of this country. When the Chinese government defaulted on the payments of accounts for supplies for such commodities as locomotives, cars, steel, lumber, candles and kerosene oil, she cut herself off from the great commercial centres of the world. And until China pays these debts, not out of additional loans, but from her enormous revenue, which is now being frittered away in civil wars and corruption, there is little hope of any of her natural resources being developed as they should.

The question often arises, *What is the cause of China's troubles ? What should China be in this condition ? Why cannot China have the standing in the world equal to such small countries as Rumania and Latvia ?*

To these questions there can only be one answer :

When Yuan Shih-kai organized the model army of China on the Machang training camp he bequeathed to China a monster which has consumed the wealth of the country, brought famine and disorder, killed millions of human beings, destroyed crops and villages and made the land a prey to every selfish and predatory interest.

China to-day suffers from militarism, not the form of militarism which was so bitterly denounced during the war, not militarism which seeks national aggrandisement, the enlargement of frontiers, the seizure of the colonies of other nations. But militarism which attacks its own country, which makes its own people suffer, which brings within its own boundaries a veritable reign of terror. This is the curse of China's army.

A conservative estimate of the size of China's army is one million men. To this must be added approximately one million armed bandits scattered throughout the country. These two groups are really of the same personnel, because bandits are usually defeated soldiers, while soldiers are usually former bandits in regular employment. These two million men work under commanders whom they trust and who arrange for their employment. The commanders are usually men like themselves, graduates of the bandit camps, often from the provinces of Chihli and Shantung. These commanders make arrangements for employment with a scholarly type of soldier known as the division commander, *tuchun* or *tupan*, that is, the soldier-politician who holds territory. The soldier-politician holds his territory by virtue of the support given him by these fighting mercenaries whom he must clothe and feed and whose chief must be given a opportunity for self-enrichment by being placed in a position where he can either " squeeze " the people or make a profit by the large but illegal trade in opium. When the fighters lose confidence in their soldier-politician, they sell out either to his enemy or to a subordinate in whom they have greater confidence. In the case, for example, of Wu Pei-fu, they sold out to his enemy. In the case of Chi Hsieh-yuan, they sold out to a subordinate.

It will be seen from this brief sketch of the military organization of China that no principle is involved in all this fighting: it is simply a matter of mercenaries preferring soldiering to banditry and seeking for a master who can supply clothes, food, quarters and the tools of their trade, arms and munitions. As long as a soldier-politician divides with his commanders, they fight for him and bring him revenue. When his exactions become so great that the people rise against him, they desert him, since his capacity to provide him with necessities has ceased. Should his political program be such that he cannot succeed, they desert him because his poor judgement gets them no profit. Should his conscience be superfine, they desert him because they regard his foolish scruples are harmful to their interests. If the history of republican China is judged from this standpoint, it will be found that every political and military event fits clearly into the picture.

The originator of this system of soldier-banditry was Yuan Shih-kai, often extolled by foreigners as a great and strong man, but in the light of history, as harmful and miserable a creature as ever any country produced. During the Taiping rebellion, it became necessary for China to organize a force capable of putting down the disorders. One force was organized in the Yangtze valley under the leadership of the Viceroy Tseng Kuo-fang, who preferred rich and scholarly men, fine looking young fellows of good families, who could not fight but who talked heroically. In the north, an army was organized under Li Hung-chang, who took farmers and bandits and the riff-raff of the north, hard, husky individuals, capable of learning the game of war and keen for power. This northern group eventually became the Peiyang army, the model army of China, under the leadership of Yuan Shih-kai.

A short history of this army was recently given in the *North-China Daily News* in an article by George E. Sokolsky, a correspondent who specializes in such matters :

" When Yuan Shih-kai was creating a model army he was assisted in his efforts by Feng Kuo-chang, Wang Shih-tsen and Tuan Chi-jui. And when some years later he was forced to retire to Honan after the death of the empress-dowager, Tszu Hsi, and the Emperor Kuang Hsü, his model army was nominally under an appointee of the throne, but it was actually commanded by Feng Kuo-chang and Tuan Chi-jui.

"Yuan Shih-kai was recalled in 1911 to save the tottering Manchu dynasty. He was re-appointed by imperial decree to assume the position of commander-in-chief of the model army, then known as the Peiyang army. At this time Feng Kuo-chang was engaged in suppressing the revolution at Hankow, while Tuan Chi-jui was in command of the troops in Peking and its vicinity.

" When the revolution had begun to show its teeth, Yuan Shih-kai obtained the assistance of Tuan Chi-jui in calling upon the Manchus to abdicate, and simultaneously ordered Feng Kuo-chang to prevent the rebels from advancing. At the same time, it is known that Yuan did not wish Feng Kuo-chang to gain a decisive victory over the revolutionists as it was his plan to impress the Manchus with his difficulties in overcoming the forces under Hung Hsin and Li Yuan-hung.

" The Manchus were forced to abdicate and, after a threat of invasion of the Yangtze by Yuan Shih-kai, the revolutionary government at Nanking abdicated in as graceful a manner as possible. This gave Yuan Shih-kai control of the situation and he was formally elected provisional president of the republic of China.

" Yuan Shih-kai had been out of touch with the officers and troops of the model army which had become accustomed to taking its orders from Tuan Chi-jui and Feng Kuo-chang. To prevent these two from combining against him, Yuan Shih-kai set about stirring up dissensions between them. Tuan Chi-jui was made minister of war in Peking, while Feng Kuo-chang was given the less important office of *tutuh* of Chihli.

"It was not long before these two military leaders were quarrelling, but unfortunately for Yuan Shih-kai neither Tuan nor Feng trusted him and their differences became a three-cornered fight. Yuan Shih-kai used mercenaries such as Lu Yung-ting, Chang Hsun, Lung Chi-kuang and Hsu Pao-shan to strengthen his position. He sought to reorganize the model army so that it might become his organization. Tuan Chi-jui, at the same time, was bending every effort to have the original Peiyang army maintained as a national organization—as an indivisible unit. Feng Kuo-chang was doing his utmost to take as much of the Peiyang army as possible away from Tuan Chi-jui, so that it might become his personal army to be used as he thought fit.

"In 1913 Feng Kuo-chang took advantage of the second revolution to come south and, after its suppression, he became *tutuh* of Kiangsu, the strategic point for any militarist in China. He at once began to extend his influence, his subordinates being appointed to important positions in the various provinces along the Yangtze. His military faction came to be known as the Chihli party because he was a native of Chihli. Tuan's faction came to be known as the Anhui party.

" After the death of Yuan Shih-kai, Li Yuan-hung, who was considered an outsider by the Peiyang militarists, became president. Although the constitution provided that the vice-president was to succeed the president under certain circumstances, military men regarded such succession as accidental when it interfered with the normal seniority within their own ranks. Li Yuan-hung was never permitted to gain control over any part of the Peiyang party. He became dependent upon the two chiefs, Feng Kuo-chang and Tuan Chi-jui. Since neither of them liked him, he failed as president and was finally ousted from office during the Chang Hsun *coup d'état*.

" During the *coup* Tuan Chi-jui was at Tientsin. He was persuaded by his subordinates to take command of the forces opposing Chang Hsun. He gained the credit of restoring the republic. After capturning Peking, Tuan Chi-jui found himself in an awkward position. Feng Kuo-chang, vice-president and his personal enemy, was at Nanking in command of the Yangtze, while he was in Peking without any authority to act. As premier, he was compelled to make whatever appointments Feng Kuo-chang required before the latter would come to Peking to assume the presidency. These appointments left Feng Kuo-chang in complete command of the Yangtze.

" Matters would perhaps have run smoothly, had it not been that the south again rebelled. This time, Tuan Chi-jui decided that the revolutionary element in the south had to be suppressed and the country unified by force. Feng Kuo-chang allowed him to send expeditions into Hunan and elsewhere, lending him some of his own troops for the purpose. But Feng Kuo-chang was treacherous, giving secret instructions to his own troops not to fight the southerners, thus placing Tuan in an impossible position. Tuan Chi-jui's followers now decided that the only thing to do was to wait for the expiration of Feng Kuo-chang's term as president. Large sums were raised to elect a president whom they could control. An illegal parliament was arranged, which made Hsu Hsih-chang president of China. This is known as the Anfu parliament.

" Tuan's followers soon found that Hsu Hsih-chang was not to and be trusted, that his policy was to keep himself in power by intrigue and unscrupulous politics. He played the Chihli and Anfu parties against each other.

" Wu Pei-fu now comes into the picture as the protagonist of the Chihli party against the Anfu leaders and his nominal ally is Chang Tso-lin. Tuan's Chi-jui's armies were defeated (1920) and he retired to private life. Chang Tso-lin did everything possible to control Peking and its government, to lessen the influence of Wu Pei-fu, the rising star on the horizon. Hsu Hsih-chang then began to play off Chang Tso-lin against Wu Pei-fu, his policy leading to another war and the defeat of Chang Tso-lin who retired beyond the wall."

Since 1920, it has been the same old story. Members of the old Peiyang party fight each other to retain the positions they hold, while others fight them to get them out of their jobs. Hsu Hsih-chang ceased to be president and Li Yuan-hung was again given that post by the military men. Feng Yu-hsiang drove Li out and Tsao Kun was placed in office, only to be made a prisoner by Feng Yu-hsiang and Tuan Chi-jui. And so it goes !

Meanwhile, China is the sufferer and the foreigners living in China witness the unending ugly spectacle of the masses of the people trying their utmost to keep the country in a healthy condition, while their governors, all soldiers, all military men, are destroying what they build, are eating up what they produce, in these wars for jobs.

Is China Turning Red?

FOREIGNERS in China have found cause for considerable worriment over the prospects of China becoming a bolshevik state. The relations between Dr. Sun Yat-sen and General Feng Yu-hsiang with Mr. Karakhan, the Soviet ambassador, have been widely advertised and have led to a supposition that these leaders together with all the Chinese who are associated with them or who follow them, are convinced bolsheviks and that once in power, they will adopt a bolshevik economic and social program.

Le Matin particularly lost its temper on the subject, the news agencies carrying a telegraphic item from that newspaper which received a very wide circulation in China :

The "Le Matin" Telegram

"PARIS, December 23 (Kokusai)—*Le Matin* foreshadows the proclamation of a Soviet republic in South China by Dr. Sun Yat-sen.

"The paper declares that the new Soviet, when established, will be essentially nationalist, and emphasizes the value of French expert opinion to the effect that, in spite of the suggestions from America, the powers must show a solid front in China.

"*Le Matin* declares that it will not be reasonable to permit an increase of the customs for the benefit of a government which does not meet its obligations, and will, if it has a full treasury, be able to subsidize the Chinese bolshevists and enable them to extend their power all over China.

"*Le Matin* further asserts that the attitude of Japan will be the deciding factor.

"According to the French experts' opinion, says *Le Matin*, the Powers must show towards the Chinese disturbances a common front and great firmness. This policy, it adds, is contrary to the suggestions that emanate from America.

"Further events in China will depend on Japan's decision, adds the paper."

The Hongkong press, impressed by the unfortunate situation in Canton, has been foretelling the probability of the establishment of a Soviet state in China for some time To Hongkong, Dr. Sun is usually anathema, whether he is on friendly terms with Russia or with no one and the possibility of attacking him presents itself to the Hongkong editorial writers as a joyous occasion, although they sometimes forget that much of Dr. Sun's popularity among the Chinese has been due to the antagonism toward him of the foreigners in China, the Chinese regarding unfavorable foreign comment as a proof that he is defending his country against predatory foreigners who have only ulterior motives with regard to their country.

Bolshevism Not Possible in China

Bolshevism is a phase of socialism which has to do with certain economic and social theories developed in Russia. The basis of bolshevism is the Marxian doctrine of the class struggle between capital, labor and the peasant. The strength of bolshevism lies in its insistence that the laboring class shall control the means of production and distribution and shall establish a governmental control over everything in the country with a view toward protecting one class of the population, labor. It makes certain concessions toward the peasants, but none toward capital. It premises its whole doctrine upon the existence of a highly organized industrial state in which capital and labor are in constant conflict for the returns on production. It ignores the middle class, which is not a participant in such struggles, and usually terms such men the tools of the capitalist class.

Such a state as outlined above does not exist in China. China is an agricultural country, more than eighty per cent. of the population being actually engaged in farming and similar industries. The labor population is only slightly industrialized, according to the modern economic sense of the term. The remainder still labors under the medieval handicraft system under which craftsmen, journeymen and apprentices have almost a family relationship. Except in the large cities, particularly the treaty ports where foreign enterprise has brought in the modern factory and mill, there are no modernized industries and there is no class struggle. Every apprentice expects that in due course, he will become the owner of a shop in which the goods he has learned to make, will be made and sold. Every owner of such a shop expects that his apprentices will eventually leave him to start out for themselves. The system is primitive, simple and similar to that which existed in Europe before the 18th century. Such a system can in no way be utilized for the establishment of a bolshevik state.

Russia's Part

The Russians apparently understand that. For their activities have been centred, not on the laborers, but on the student class. They have appealed to the intelligent, articulate elements, not to participate in a class struggle, but to join Russia and China in a nationalistic, highly patriotic contest with the Anglo-Saxon international financiers, who, according to their theories, are trying to dominate the world and to subject all non-Anglo-Saxon peoples to their will. This argument has met with a certain success because there is always in China a very noisy element which is opposed to the presence of the foreigner in the country and which is jealous of the enormous success of the Anglo-Saxon, particularly the British, in the development of trade and industry.

This element has unfortunately been supported by certain university professors who have been chagrined to see their own schools closed because of civil war and the ineptitude of China's officialdom while the American and British supported universities and schools have been open and full and have attracted the best elements among the students. These professors have started a movement to force such mission schools to become part of the governmental educational system of the country which would force them into the unfortunate politics of China and which incidentally would give China's educationalist-politicians a hold over them.

This movement is not bolshevist : it is anti-foreign. But it is not as anti-foreign as it is a selfish attempt to utilize the enormous resources of the mission schools for educational politics in China and to force the foreigner to turn over the best educational institutions to men who have failed to keep their own schools open and efficient during the period of civil war. The movement is unfortunate, but inevitable under conditions as they are and nothing will avail of mistaking and misunderstanding it to satisfy a European propaganda with regard to bolshevism.

Dr. Sun's associations with Mr. Karakhan is purely political and opportunistic. Dr. Sun has always maintained that he has the right to accept whatever assistance comes to him from whatever source in his efforts to carry out his ideals in China. He has at times accepted assistance from Japanese and from Frenchmen. He has been aided by Chinese born in the United States and in British colonies. He has taken refuge in Japan, Britain, the United States, Annam and other places. His present association with Russia, as reported, cannot mean that he will sell China to Russia any more than he has sold China to other countries. He is not that kind of a man.

We must then ignore the general cry of bolshevism. We must rather study the trend of opinion which makes the general anti-foreign movement so important and so sinister to foreigners living in China and to foreign businesses which have interests in China. The initial error which led to the damaging of the prestige of the foreigners in China was the expulsion of the Germans in this country after the armistice. The Germans were a highly respected people in China and their physical might was duly impressive. Their collapse and the picture the Chinese saw of Europeans being herded like cattle and driven from their country had altogether a different result from that intended. It gave them to believe that all Europeans might some day be dealt with in that manner. It caused them to assume that if such an end might come to Germany, it might come to any European nation. It is known that some of the keenest British and American minds in China, men of prescience and foresight were opposed to such an act. But they were outvoted in the general cry for action against the Germans.

And the Chinese theory that the same might be done to other Europeans soon found proof in the fall of Russia. Thousands and thousands of Russian refugees wandered about China begging food. Unfortunate Russian women sold their bodies and souls to wealthy Chinese to keep from starvation. Russia's treaty rights in China were annulled, as were the rights of Germany and Austria-Hungary. In a word, the mighty Bear was no longer mighty, but a beggar. Another European monster had been slain, according to the Chinese view. Of the western powers, only two remained important in China, Great Britain and the United States. France and Italy trailed along, trouble-makers for China and for their allies. Japan was the one Eastern power with which China had to deal.

Then came the anti-Japanese boycott in 1919, a movement which was regarded with favor by most of the Americans in China and by large numbers of Britons. This movement gave an impetus to Sino-American friendship of the sort which flower-girls offer at midnight. In the course of that movement the Chinese found that by hampering trade, by embarrassing individual firms, by propaganda abroad and noise at home, they could bring about certain political results favorable to themselves. Having learned that lesson they turned their weapons on those who forged them. They turned on their teachers. They asserted that they would break all treaties, denounce the rights of all foreigners, destroy the fundamental relationships between Chinese and the European nations and do unto the Anglo-Saxons as they did unto the Russians and the Germans. The Soviet saw value for themselves in such talk and encouraged it. If this is bolshevism, then there is a bolshevik movement in China. If this is an anti-foreign movement and only that, it is much more sinister in its aims and ideals and is worthy of the most careful consideration by the foreign powers.

One of the Chinese who is reputed to be a bolshevst recently published a statement in *La Revue Bleue* on bolshevism in China. Tsai Yuen-pei is chancellor of the Peking national university and has been minister of education in China. He is a keen mind and exercises an enormous influence over the youth of the country. His statement is here partly reproduced because of its inherent importance and because of the significance of the man:

Dr. Tsai's Opinion

Confucius says: "If the people of other lands are unwilling to become subject to you, improve your culture, perfect your institutions, and thus win their hearts and judgment." Mai Tzu, a philosopher of the age of Confucius, taught that while it is well to have a strong army to defend the country, it is criminal to pursue imperialist policies, and compared nations that did so to hordes of common brigands. In the seventh century B.C. a whole philosophical school sprang up to propagate the doctrine of anti-aggression. Mencius says that "whatever boasts of his skill as a soldier is a criminal and those who excel in war ought to be put to death."

"These pacifists and anti-militarist doctrines have never lost their hold upon Chinese thought. Since that time our writers and poets have always depicted war as horrible and have sung the blessings of peace.

"Let us next consider communism and relations between classes. Antagonism between capital and labor is one of the most serious problems of our epoch. The Russian revolution sent a thrill of fear through the entire world. Some people think that China will follow in the footsteps of the bolsheviks. Let me hasten to say that a 'terror,' whether it be red, white or any other color, has little chance of finding favor among the Chinese. We did, at one time, have a Communism of a much pleasanter kind in China. According to the philosopher Mencius and later which one was cultivated directly for the profit of the government and the eight others distributed to eight families or clans. Each family tilled its own land, and all joined together to till the land belonging to the state. When a citizen became 20 years old he received a holding, which he returned to the government when he reached the age of 60. Those below the age of 20 and above the age of 60 were supported by the state. Efforts were made to restore this system in the first, fifth and eleventh centuries A.D., but without success; yet even to-day it has many partisans, especially among the educated classes.

"There is a very old adage in China which says: 'If a man does not labor, one person goes hungry; if a woman does not spin, one person goes cold.' To work is the duty of every citizen. In the fourth century B.C. we had an odd phlosopher in China—he might be called a labor radical—named Hsun Tzu, who taught that the monarch himself ought to cultivate the land in the same way as his subjects, in order not to be supported by them.

"Confucius said: 'We should not be distressed if the citizens are few, but we should be distressed if each does not receive an equal share of what all produce; we should not be disturbed because the citizens are poor, but because they are discontented on account of the inequality of riches.' He has also said: 'It is not well for wealth to be left buried in the ground, but it is not necessary that it should belong to you. It is not well if you neglect to use your strength in productive labor, but it is not necessary that you should work for yourself alone.' Throughout the whole philosophy of China the principle is recognized that excessive wealth and excessive poverty are wrong. Primogeniture does not exist. The estates of the parents invariably descend equally to all the children. Thus great fortunes are subdivided within a few generations. Immemorial custom requires the rich to maintain their needy relatives and friends, to assist them to earn their own living, to establish charitable foundations, such as setting aside land the revenue of which shall be used to support the aged and the poor, to found free schools, hospitals and orphanages, and in some cases to build bridges and highways, and to erect shelters for travelers.

"In China the wealthy usually live almost as simply as the poor. For that reason the poor have seldom hated the rich. Although within the last dozen years or so great corporations and modern industrial establishments have grown up in China, the antagonism between capital and labor is not as yet strong. Measures developed in Europe and America for the protection of the working people are being adopted, and most of the new corporations are owned by a great number of shareholders. A concentration of capital in the hands of a few great magnates is hardly to be feared.

"If we are to have communism in China, it will be a pacific communism, without the relentless class-struggle preached by Karl Marx."

Unification by Means of Internal Free Trade

"PUTNAM WEALE," otherwise Mr. Lennox Simpson, editor of the *Far Eastern Times* and sometime advisor to the Chinese government, in an interesting New Year proposal for China, suggests that the most feasible method for unifying China is to abolish the internal customs barriers, particularly the archaic inter-port dues, which impedes the progress of trade developments.

He criticizes an article by Sir Francis Aglen, the inspector-general of the Chinese maritime customs, in which the latter favors the immediate convocation of the proposed customs conference, so that China might have additional revenue and every one be benefitted thereby. Mr. Simpson says in part:

"Although we are at the dawn of the year 1925, a system such as exists at Chinese ports to-day, of charging export duties for everything going out of a port to another port and import duties on everything coming in from a brother port—this system is not even mentioned although it is archaic, harmful, anti-nationalistic, subsersive and astounding. Coast trade duties, which have been unknown in any other part of the world for centuries; which make it impossible for people to carry on home-trade legitimately; which necessitate masses of greasy documents in two languages, heavy staffs and unending delay; which retard development,—these are to be left. The thing which would kill likin automatically, i.e., being able to move goods by water tax-free from Hankow to Tientsin, from Newchwang to Canton, or from anywhere to anywhere else in China, is not touched, upon. Three years ago I myself insisted on the point to Dr. Wellington Koo at Washington and suggested that it should be China's central argument; for it would touch the public as much as the fact that foreign nations maintained their own post offices in China. His answer was characteristic:—'It is easy enough to abolish taxes, but it is hard to impose new taxation.' A Daniel come to judgment indeed! Yet coast-trade duties give China something to bargain with. She could offer their immediate abolition for an immediate import tariff increase which would bring as great a revolution as the few existing railways have brought."

There is much in Mr. Simpson's argument, except that he, like Sir Francis Aglen, overlooks the fact that the remedy for the international difficulties of China, as well as for the chaotic condition of China's finances, lies not in the handling of this or that item of the problem, but of the whole. The customs revenue, the salt revenue, the loans, internal and external, the revision of archaic treaties, the abolition of extraterritoriality, the retrocession of concessions, the recognition of full sovereignty, cannot be discussed as separate items without sacrificing the general position of the foreigners in China. Of course, there are those who do not care anything about the position of the foreigners in China, who maintain that because treaties were written sixty years ago they have invalidated themselves by old age, that China can abrogate these treaties by simply denying their existence, as Russia did. But such a view can be of no benefit to China, for there is no governmental agency in the country which is prepared to handle any new situations which might arise out of the changes. Were China a modern state, unified and with an effective government, there would be no problems. The wealth of resources, the man-power, the size of her territory would in themselves solve the outstanding international problems. But China has no government, China knows no unity, China is incapable of creating agencies to handle her internal, much less her international problems. How then can one expect at this moment to find a formula for the rectification of wrongs on both sides ?

The status of nations is constantly changing. Every European war had seen such changes. The war of 1914 saw the fall and disappearance of the tremendous Hapsburg empire. Germany ceased to be a dictator of policies and became an problem. Russia ceased to dominate a phase of European affairs and became an outlawed nation. The United States, which for a century or more, had avoided European entanglements, became an active participant in European affairs. And so it went. But China has more or less remained static. China's international position remained unchanged, except as her affairs became affected by the changing conditions of the other nations. China's passive participation in the great war entitled her to a seat at Versailles, but the internal and international situation of China was altogether unaffected by the events which brought the Versailles conference into existence. The Washington conference was called not because the situation in China required any change in her status as much as because the relations between the United States and Japan required readjustment. In short, China is as much surrounded by a great wall to-day, so far as international relations are concerned, as in the most gloomy days of isolation.

To all the powers, particularly such as are deeply concerned over China, whether for sentimental or selfish reasons, this unimpressionability of China is a serious problem. For nothing can be done for a nation which does nothing for herself, or to put it in other terms, which does not change her status in accordance with the general trend of political progress in the world. The creation of a new source of revenue or the increase of existing revenues in no way solves the problem. For the mental attitude of the governors of the country is medieval and they regard all revenues as personal, to be utilized for the enhancement of personal power and the increase of personal wealth. This view is altogether out of harmony with the political period in which we live, when national states are regarded as the suitable units of peoples and when the soverignty of states rests with the people thereof. At a time when national states are so well organized that they seek international relationships with a view toward minimizing the conflicts arising out of differences, China has not yet become a national state, but is attempting to function feudalistically. And what makes the condition more disturbing is the fact that feudalism is becoming strengthened by the march of events.

The Washington conference offered a plan which might have helped China were the Chinese people in a receptive mood for such assistance. The nations of the world, having interests in China and having treaties which the modernized Chinese (a handful) regard as umbrageous, would meet to consider the revision of such treaties if China undertook to reorganize herself on the basis of a modern national state. No provision was made that China was required to follow a model in the west, but rather was it hoped that China would evolve out of her political consciousness some form which could make it possible for the other national states to regard her as an equal. That opportunity was altogether missed, as Turkey did *not* miss it. China was willing to accept the benefits of the Washington conference without assuming any of the responsibilities or obligations arising from such an agreement. As a matter of fact, since the Washington conference, the process of feudalization has become more accentuated and the international position of China has become worse.

In such a situation to attempt to solve isolated problems is simply to bring about further complications. One or two lines of activity present themselves : the first is that the powers ignore all suggestions of change and wait until China has evolved a national state before any changes are made. The other is that the powers meet independently of China and draw up definite and concrete proposals suggesting what they would do if China made certain specific improvements in her own situation. Such a course would throw the onus of failure upon the governors of the country, who must in time realize that in accordance with current political ideals, the habited portion of the earth must be regarded as a unit and that the disturbed condition of any area affects the whole, that the better organized and therefore more powerful nations cannot ignore the disturbance of life throughout the world by the more poorly organized and unprogressive nations and that China's failure to keep pace with the political progress of mankind is not an internal but and international problem.

Perfectly Sound Americanism

IN a striking editorial on migration and world policy, *The Chicago Tribune* says :

> "Japan wants to send 5,000 agriculturists to Mexico. That is a detail. It is a minor incident of human restlessness. It will have consequences. A mission has been sent there to establish industries and settlements on the Mexican west coast. There was a treaty signed October 8, of amity, commerce and navigation. Japan with France, Japan with Italy, Japan with Russia, Japan with Mexico, Japan with China and others is building up a structure of relationships that may serve her well when she comes to the showdown on immigration. She will try to extend her sovereignty with her emigrants . . .
>
> "For modern immigration is neither tribal nor state supported in the form of colonies. It is individual, and the controls put on it are laid there by the receiving land. That right of the recipient is still questioned. Japan questions it, and well nigh brought the league of nations to her view. Italy questions it. The majority of nations who export immigrants question it. They stake their present necessities against the future needs of younger, underpopulated lands. They are prevented from collecting those necessities only by implicit force. That is Monroe doctrine.
>
> "Such is the Singapore base. It is frankly force to defend the potent emptiness of Australia, New Zealand, Canada for future white men. Pearl Harbor is a force to defend the naked coasts of America for a culture and a stock that we have chosen to perpetuate. Without implied force those relatively empty lands would straightway be overwhelmed by yellow peoples whom we have taught through science and modern industry to preserve their populations and to increase. The danger is of our own arousing. It could not be otherwise. We had to start it. We must check its drive on us."

Correct. But must the United States also constitute itself into a bulwark against the silent but irresistable pressure of the Japanese on other parts of Asia ? Must Americans carry their ideas into this continent and say to the Japanese, "you may not enter into or own lands in the Philippines: you may not enjoy the fruits of your hard won victory over Russia and China in 1905 : you may not send your surplus population into Manchuria or Mongolia : you may not seek an outlet in the vast uninhabited wastes of Siberia stolen from the yellow man by Russia : you may not acquire any preferred position in the trade or development of China that will enable your people to exist at home : you may not defend yourself against "the menace from the direction of Urga," for, if you do, you must reckon with us. American rights to equal trade opportunity in these regions are vastly more important than Japan's right to exist. That is the Open Door doctrine. That is America's conception of her rights in Asia as written into the consortium agreement. Perfectly good Americanism.

Japanese Electrical Equipment

AN order for power plant machinery and equipment, valued at more than $1,000,000 (gold), has been placed by the Nippon Denryoku Kabushiki Kaisha (Japan Electric Power Company) of Osaka, Japan, with the Escher-Wyss Company for turbines and the condensers. Siemens-Schuckert Company has been awarded the contract for the generators, and Babcock and Wilcox (through Mitsui & Co.) will build the boilers. The motors necessary to operate the auxiliary pumps are to be built by an American firm.

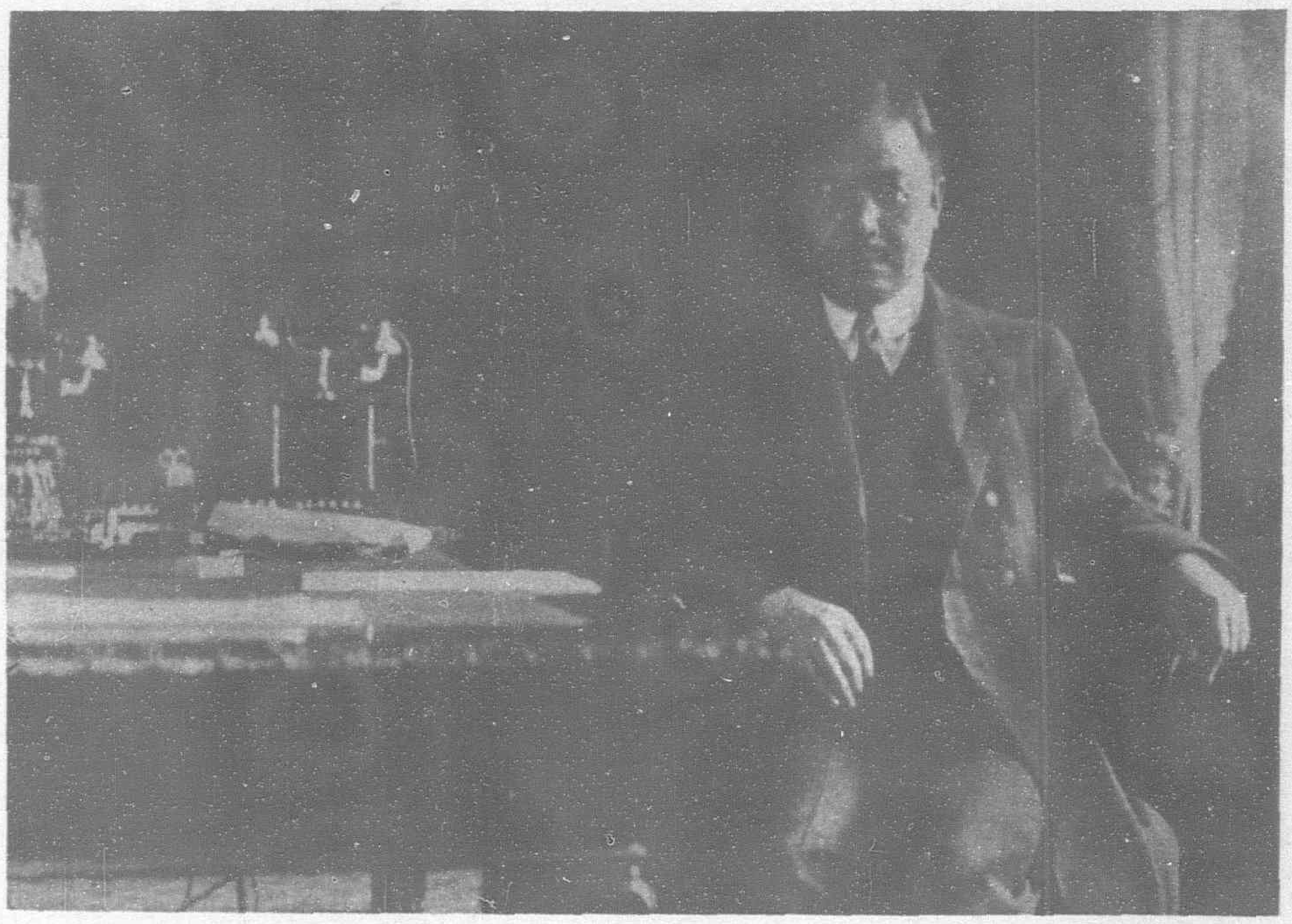
The prices quoted by American companies were approximately 40 per cent. higher than those quoted by foreign competitors. The terms of credit granted on these orders will cover a period of three years.

It is also reported that Mitsui & Co., Ltd., has awarded the contract to William Cramp & Sons, Ship and Engine Building Company, for three 13,000 horse-power turbines with governors, intake pipe and pen-stock valves, to be installed in the Aso River station of the Cifu Electric Power Company. The contract represents the first order for hydraulic machinery to be placed with Cramp by Japanese interests and will constitute part of the extensive superpower developments of Japan.

Have Faith in Coolidge!

ADMIRAL Okada, commander-in-chief of the joint Japanese naval squadrons, has taken upon himself full responsibility for declaring that the Japanese navy is not in the least concerned about the American naval manœuvrs in the Pacific. If he had announced that the Japanese were delighted to learn that the American program coincided with their own intention to hold the annual Japanese manœuvres based on the Caroline and Marshall Islands against a possible attack by the combined Chilean, Peruvean and Patagonian navies, it would have effectively silenced the jingoes of both nations and given the world something to laugh about. Japan has a perfect right to hold her 1924 war-game in that section of the Pacific simultaneously with the American navy with some South American country as the hypothetical enemy. Such explanation would be just as logical as that advanced by the American authorities.

The Japanese in our opinion are unduly alarmed about America's ambitions in the Pacific. If the real truth was permitted to leak out, it would reveal that the United States is intent upon extending its shadow over the Elysian playgrounds of the South Seas discovered by that great American voyager, Frederick O'Brien. Nothing has so stirred American imagination and the strong red-blood of the adventuresome pioneer than the glowing descriptions of these lands of flaming youth, burning desire and September mornings brought home by O'Brien and the navigators of the *Kawa*. In order to mislead the rightful owner of these open-air gardens of delight, Americans are advertising Japan as the imaginary enemy. We dislike to be unpatriotic and divulge national secrets but the acquisition of the Marquesan Eden is now the cardinal feature of our Pacific policy, the real objective of our naval strategy. At least, we submit that this is just as plausible as any other explanation.



Baron Shidehara, Japan's Minister of Foreign Affairs, at his Desk in the Gaimusho. A Brilliant Diplomat whose Close Intimacy with Secretary Hughes and Sympathetic Understanding of America's Policies Contributed Largely to the Success of the Washington Conference and Paved the Way for American-Japanese Co-operation in Finance and Business

Let us explore this hypothesis along more serious lines. American jingoes may feel that their best interests are served by co-operating with Great Britain and Australia and making use of the Singapore naval base in the event of war with Japan. Great Britain may encourage this idea and endeavor to bring about an *entente* with America that will cover Pacific and Far Eastern questions, but as long as France is left on the outside all such scheming will result in failure. The real key of the south Pacific is held by France, whose strategical position in Oceania constitutes an effective checkmate to Anglo-American co-operation in these waters.

If the British naval base at Singapore is to be construed as a menace, it is as great a menace to France as it is to Japan. Also, and to a greater extent, to the Philippines. French publicists are fully alive to its significance. The best naval harbor on the east coast of Asia outside of Japan is Camranh Bay in Indo-China, with the well-equipped ports of Saigon and Haiphong as secondary bases, all three connected by a coast railway. Add to these the harbors of Tahiti and Mangareva and the hundreds of isles that could serve as secret submarine bases amongst her Polynesian possessions, the strategical position of France is such that her friendship and neutrality is essential to any power entertaining serious thoughts of waging a Pacific war.

France has no naval force in the Far East of sufficient strength to adequately defend these possessions. Should France permit their use by the Japanese navy in return for Japan's protection to these very vulnerable possessions, it would impair, if not effectively nullify, any Anglo-American pact covering this part of the world. The position of France in any test of naval strength in the Pacific would at some particular juncture decide the issue should she place her colonial resources at the disposition of either side. There are indications that Japan and France fully appreciate the new trend of affairs, and have arrived at some understanding or "agreed memorandum" in the event the other line-up should develop into a certainty.

As long as France holds the key to Pacific peace there will be no war without the would be beligerants knowing exactly where she stands beforehand, and as she has everything to lose and nothing to gain, her possession of the key is a quarantee of peace.

* * *

As to the wisdom of providing the Japanese with further cause for alarm about American policies in the Pacific there can be no two opinions. The Japanese do not forget how on a previous occasion the American battle-ship fleet was sent into the Pacific with the avowed purpose of impressing them with our strength. Neither do they overlook the military significance of the recent round-the-world flight which brought American army aviators across the Pacific to their shores and provided them with the data on which to base further operations. At a time when relations between the two countries are not as cordial as they should be because of Japanese resentment against our exclusion laws, American jingoes have prevailed upon the navy department to repeat the former blunder. As in the case of our immigration law, there is no question of America's right to hold her annual war-game in the Pacific with Japan as the imaginary enemy. It is simply a question of tact,the avoiding of another error providing the jingoes of both nations and those outsiders anxious for reasons of their own to see Japan and America come to grips, an opportunity to redouble their pernicious activities.

That the opportunity was seized is attested to by the fresh outbreak of war-talk indulged in by the excitable elements of both nations. In America, Secretary of the Navy Wilbur, supported by Admiral Bradley A. Fiske, Captain William Shealer and other highly placed experts, asserts that it is a self-evident fact that Japan will one day become America's enemy, while congressman Britten started a campaign for a union of the white nations against Japan. What Japan would gain by waging war with the United States is not quite clear. If she wins, she loses. The same applies to the United States. There is nothing to be gained by a war between Japan and America but loss to either side. If American jingoes could glimpse with their own eyes the depressing poverty of Toyko and Yokohama with their miles upon miles of temporary thin, match-board shacks doing service as houses and grasp something of the tremendous, heart-breaking, up-hill fight confronting the Japanese in restoring their ruined homes and places of business, they would understand perhaps how grotesque it would be for such people to indulge in war-dreams with a super-power like the United States. Forces of nature inflicted upon a Japan a loss far in excess of any defeat she might have suffered in a modern war and with the lesson of the great war still fresh in their minds, the rulers of Japan are not curting complete ruin by wantonly provoking hostilities with America.

Admiral Okada frankly recognized the real spirit behind the American naval manœuvres and sympathized with the efforts of the American authorities to be prepared against all emergencies in the Pacific, while Premier Viscount Kato told the members of the Seiyukai party that

> "The American government notified us some time ago of a desire to remove misunderstanding in Japan caused by the proposed naval manœuvres. America declared her willingness to let all the American war vessels taking part in the manœuvres, visit Yokohama after they were over, so that distrust about the motives of the manœuvres might be erased.
>
> "We told the United States that such a visit was not necessary and declined acceptance of the offer. From this, it is evident that the United States is anxious to secure the understanding of the enlightened classes of Japan."

This incident illustrates that although the thinking men of Japan are not worrying about the American naval manœuvres and accept America's frank expression of friendly sentiment, they realize the danger that might be created by the visit of the American fleet to Japan and the misunderstandings that might arise when a large body of men were granted shore leave in a port and capital city ill-prepared to receive them.

Secretary Hughes, departing from all precedents, administered a well-merited and severe rebuke to the American jingoes in a statement welcoming the appointment of Mr. T. Mastudaira as ambassador to Washington, in which he received the endorsement of President Coolidge. The statement, so faithfully reflecting the policy of the present administration, is one of the most important documents bearing upon the relations between Japan and America. Mr. Hughes said in part:

"The authorities of the United States find the inflammatory movement respecting the relations of Japan and the United States incomprehensible. The American authorities in Washington are unable to point out clearly who the instigators are, though it is true that certain publications and speeches have engendered misunderstandings between the two countries. So long as any incendiary propaganda is allowed to be carried on, the governments of Japan and the United States will be put to very great enbarrassment. The American officials are of the opinion that the relations of the two countries are to-day unprecedentedly well. Starting from the naval disarmament question, Japan is not only respecting and living up to the spirit and the decision of the Washington naval treaty but is taking every opportunity of showing her sincerity to put in force all the agreements entered into at Washington concerning China and the Far East. The American government also recognizes the fact that the Japanese government is exercising the greatest efforts for the reconciliation of the feelings of the peoples of the two countries.

That Japan has specially appointed such a great statesman as Mr. Matsudaira to be Japanese ambassador to Washington is sufficient to endorse the above fact.

Furthermore, the withdrawal of Japanese troops from Siberia, the retrocession of Tsingtao to China, the announcement of the open-door policy vis-a-vis of China, the abandonment of Japan's special sphere of influence in China as a result of the abrogation of the Ishii-Lansing agreement, and the cancellation of the Anglo-Japanese alliance, coupled with the attitude Japan has taken in connection with the American immigration question and others are all fair and just, which shows how Japan is endeavouring to maintain her co-operation with the United States for the solution of various Pacific questions. While I am fully convinced that the relations of the United States and Japan will grow more friendly than ever, I cannot but believe that Mr. Matsudaira's arrival at his new post will go a long way towards accelerating the furtherance of the friendly relations of the two countries."

Hon. Edgar A. Bancroft, American Ambassador to Japan. His Message, "HAVE FAITH IN COOLIDGE," is Accepted as an Assurance of Good-Will and the Reestablishment of Cordial Friendship Between Japan and America

This splendid declaration of American trust in Japan was made the keynote of a nation-wide protest against further anti-Japanese agitation. Senator Owen (democrat) of Oklahoma, sternly rebuked the Japanophobes and jingoes on the floor of the senate and supported the administration by saying:

> "Japan is entitled to the respect and good will of the American people. The Japanese people are about as brave, as any people on the earth, and they are patriotic and emotional. They are entitled to the admiration and good will of the United States, and certainly should enjoy our universal respect.
>
> "Japan co-operated with us and with our allies in the world war; she restored the Shantung peninsula which she had taken from the Germans to China; she entered the Washington disarmament conference and signed the naval limitation treaties; she dropped the aggressive twenty-one demands on China; she withdrew troops from Siberia; and she abrogated the Anglo-Japanese alliance.
>
> "So when a courteous and considerate discussion of the exclusion question is being held, no man in congress is justified under these facts in abusing the Japanese government. If he does so he is invading the rights and functions of the executive branch of the government and is not doing service to his own country."

* * *

At the height of this agitation, Mr. Edgar A. Bancroft, the new American ambassador, arrived in Tokyo and delivered his message to Japan at a dinner given in his honor on December 12 by the Japan-American society. "My message to you and to all friends of Japan and of America is: "HAVE FAITH IN JAPAN. HAVE FAITH IN THE UNITED STATES AND IN PRESIDENT COOLIDGE!"

This message held out a promise that was not long in being lived up to.

The declaration of American friendship for Japan as voiced by Secretary Hughes and endorsed by President Coolidge was followed almost immediately by one of the finest strokes of far-seeing statesmanship in the handling of our Far Eastern affairs. This took the shape of an agreement entered into last month between the Japanese and American war departments for an exchange of language officers who will be attached to regiments of the two armies for a period of six months. Nothing could be more conducive to mutual understanding and cordial friendship than this mingling of fighting men on a basis of full equality in the every day life of the garrison and camp.

In announcing the new plan, Secretary of War Weeks pointed out that it was the first of its kind with the Japanese and was "indicative of the friendly feeling that exists between the two war departments and the two armies." Japan's War Minister, General Ugaki, supplemented this in the following statement to the press:—

> "I wish fully to endorse the statement of Secretary Weeks that this indicates a friendly feeling between the two armies. War talk is powerless in the presence of solid facts. Let me assure you that the year just opening certainly will bring an increased good feeling between our two peoples, and will disperse the last vestige, if there be any, of ill-feeling, born out of sheer misunderstanding on one party or the other."

This, and other signs indicate that the clouds of misunderstanding are being blown away and the present year will witness a clearing of the atmosphere. It may be difficult for President Coolidge to immediately modify or annul the Japanese exclusion clause in our immigration law and restore the deep respect and cordial friendship of all classes of Japanese for the United States but as time goes on and the American people grasp the real significance of this disaster to American diplomacy, to American business and the work of their churches in Japan and China, they will voluntarily demand action that will wipe out the uncalled for insult to a friendly people whose leaders have accepted our ideals as the guiding principles in their new outlook on international affairs. Events are moving rapidly and we can only wait and hope for the fulfillment of the promise held out in Ambassador Bancroft's message: "HAVE FAITH IN COOLIDGE!"

* * *

Indian Railways Make Drastic Changes

THE great changes now being made in Indian railway administration and finance are causing many British manufacturers, who cater to a very considerable extent to that market for railway rolling stock and materials, to follow the trend of events very closely.

The exact methods of management are very clearly set out in *The Times*, some extracts from which will be of considerable interest. The East India railway, which is to be taken over from the company management by the state at the close of the present calendar year, has been in existence over seventy years. The system is made up of some 2,480 miles of open line, and the capital outlay, including premiums paid by government in the purchase of the line, has been over Rs. 93 crores.

At present of nearly 37,000 miles of railway in India, over 7,000 are owned and worked by the state, and nearly 18,000 also owned by the state are worked by guaranteed companies. The Acworth commission of 1920-21 advised that the system of management by companies of English domicile should not be continued after the termination of existing contracts, and agreed that a system of management by a combination of English and Indian domiciled companies was impracticable. While five members of the committee, including the chairman, recommended that the undertakings of the guaranteed companies, as and when the contracts fell in, should be entrusted to the direct management of the state, five members, all of them railway experts or business men, recommended that the system of both state and company management should be continued, and that the government should not be committed to a policy of state management only for all railways. They accordingly proposed a scheme for creating Indian domiciled companies to manage the East Indian and, possibly the Great Indian Peninsula railway, the contract for which falls in next year.

Though there were noteworthy exceptions, the trend of Indian opinion has been strongly in favor of entire state management, and a resolution to this effect was passed in the legislative Assembly in February, 1923. Since then the assembly has become more strongly nationalist in composition, and the eagerness of a majority of its members for state management has been manifested in the discussion of the proposal for the separation of railway finance from the general budget.

Such separation has been urged repeatedly by commercial bodies and was recommended with great emphasis by the Acworth commission in 1921. The faults of the old system, whereby the railway department occupied the same position in financial matters as other departments of government, were indicated in the speech Lord Reading made to the railway conference at Simla early in October. The viceroy said that in spite of the possession of special powers and of the theoretical advantage of treatment on a commercial working basis, in practice the department was crippled for development purposes by the restrictions inherent in the system. The railways depended for finance upon money voted each year, and the net earnings of the railways went into the general exchequer.

The inevitable tendency was to expect railways to contribute more than their just share to the general revenues, and to class the powers of recovery through railways as a potentiality for adding to revenue from taxation. This tendency, as the viceroy said, killed incentive to economy in working and continuity in railway policy, and definitely operated to discourage initiative in commercial management and real increase in efficiency in serving the public. A step in advance was made when, with the approval of the legislative assembly, a capital programme was guaranteed to the railways over a period of years.

After a depressing succession of large deficits, Sir Basil Blackett was able last March to introduce a balanced budget, and to include therein a scheme for the separation of railway finance. The consideration of the scheme had to be postponed, owing to Indian criticisms, to the September session. The committee to consider the scheme at first made acceptance conditional on the adoption by the government of principles of an irrelevant character, such as the Indianization of the railway service in the higher ranks, purchase of stores in India, and the giving of a pledge by the government that no state railway should be handed over to a company without the approval of the Assembly.

As the viceroy pointed out, the purpose of a number of amendments proposed was to subject the change to conditions wholly unconnected to the principle involved. Had these conditions, which included the complete subordination of all initiative in executive action of the government to the legislature, been pressed, government, he said, would have been obliged to abandon the project.

The resolution as finally framed and passed represents, on the chief point involved in the debate, a compromise.

The railway contribution to the general budget under the original scheme was to be five-sixths of 1 per cent. on the capital at charge of commercial lines, with participation of profits after meeting all working and interest charges. The amount of contribution to the general revenues has now been fixed at 1 per cent. on the capital at charge, equal to a net payment during the present year of about £3,460,000. So far as surplus profits go, the considerable leeway to be made up in respect of renewals and repairs payable out of revenue will be absorbent for some years to come.

New Firefloat for the Hongkong Government

THE Hongkong & Whampoa Dock Company, Ltd., are building at their Kowloon works a most interesting fire-fighting float for the harbor service of the Hongkong government. This vessel will have a length overall of 101′ and 95′ between perpendiculars. The moulded breadth is 23′ and depth, 9′ 6″. She will be built of steel throughout, constructed to scantlings equal to Lloyd's highest class for craft of this type, with one steel deck sheathed fore and aft, over which for 70-ft. is a wood deck, on which are placed the fire-fighting appliances and navigation bridge ford. The hull is to be divided into six watertight compartments by five watertight bulkheads, fresh water being carried in fore peak and feed water in tanks at sides of boilers, and oil fuel in tanks at sides of boiler room.

The rudder will be controlled from the bridge by hand steering gear, rods and chains to quadrant tiller in rudder stock. A steam windlass will be fitted forward for working anchors and cables. The vessel will have accommodation for one European, saloon-bath and W.C. being in house ford, and galley W.C. and store for fire hose in house at after end of engine casing. The crew will be berthed in forward hold, and captain and engineer in after hold.

The machinery will consist of one set of triple-expansion engines —12″—20″—33″ by 21″ stroke, working pressure 180-lbs. per square inch, capable of propelling the vessel at a speed of 10 knots. An independent air and circulating pump of Merryweather's make, a bilge and general service pump, two Weir's direct-acting feed pumps, one 5 k.w. generator, oil fuel pump, heaters, filters, etc., one Howden's fan and two Merryweather latest pattern double cylinder "Greenwick Gem" vertical stationary fire and salvage pumps will be installed in the machinery space. The fire and salvage pumps will be together capable of delivering 4,000 gallons per minute, at a delivery pressure of 150-lbs. per square inch.

Steam will be supplied by two Babcock & Wilcox straight tube express water-tube boilers, having a working pressure of 200-lbs. per square inch, reducing valves being fitted between boilers and all machinery. The boilers will be oil fired with Howden's enclosed duct undergrate type of forced draught, fitted with Babcock & Wilcox's oil fuel sprayers pressure type.

The vessel will be equipped with two gunmetal swivelling monitors, and one water-tower of angle steel framework, supporting a working platform nine feet above the deck level. In the interior of the delivery pipe a telescopic steel tube will be fitted, at the upper end of which will be fixed a Merryweather 5″ monitor, operated by steel chains from the level of the platform, and which when fully extended will be 29′ above the upper deck.

The vessel will be electrically lighted throughout, and in addition will have one searchlight 18″ diameter, projector with mirror, dispersion lens and gas filled filament lamp, 2,000 candle-power.

Greater Osaka

OSAKA, called the Manchester of the Orient, because of its popularity as a cotton manufacturing centre of Japan and the Orient, will shortly become the largest city in the Orient and fifth in rank of the largest cities in the world, in point of area. When the proposed plan of annexing the two adjoining "gun"—Higashinari and Nishinari—on the north-west of the present city, the total area of Greater Osaka will become 65.75 square miles, and the population 2,030,000; at present the city's area is only 20.82 square miles and its population 1,390,000. Osaka will beat Manchester then.

Higashinari and Nishinari-guns comprise 44 towns and villages, covering a total area of 42.93 square miles and possessing a population of 642,000. By far the greater part of the area to be consolidated into Greater Osaka is at present devoted to farming. Therein lies the significance of the proposed plan of consolidation, for the Manchester of the Orient keenly feels the need of open space to build factories, and the two guns which have afforded space for that purpose in the past will do so in future, with modern improvements added by the efforts of the municipality of Greater Osaka.

The present city of Osaka is divided into four wards: Kita, Higashi, Nishi, and Minami; or north, east, west and south. According to the plans made for Greater Osaka, these four wards are to be sub-divided, creating in all eight wards, namely: Kita, Konohana, Higashi, Nishi, Minato, Tennoji, Minami and Naniwa.

Kita-ku, north ward, is to comprise the greater part of the present Kita-ku, with the exception of the Ashiwake and Ajikawa school districts, and adding the Miyakojima, Sakuranomiya, Saibi and Sonezaki districts.

Konohana-ku is to comprise the original Kita-ku, including the Kami-Fukushima, Shimo-Fukushima, Nishi-Noda, and Ashiwake school districts, and adding the Kujo and Kasugade districts of the present Nishi-ku.

Higashi-ku is to comprise the original Higashi-ku, and adding the Tamatsuri and Kiyohori districts and a district formerly known as Higashi-Hirano.

Nishi-ku is to comprise the original Nishi-ku, with the exception of a district formerly known as Iwasaki-machi in Taisho-dori.

Minato-ku is to comprise the Kujo, Sangenya, Izuo, Ichioka, and Chikko districts in the present Nishiku, and adding a district formerly known as Iwasaki-machi in the Taisho-dori and Ajikawa district.

Tennoji-ku is to comprise the Higashi-Hirano district, with the exception of a district formerly known as Higashi-Hirano, and Tennoji district in the present Minami-ku.

Minami-ku is to comprise the original Minami-ku.

Naniwa-ku is to comprise Namba district, in the present. Minami-ku, and adding the Kizu, Imamiya, and Nishihama districts.

Five New Wards

In addition to the foregoing eight wards, five new wards are to be created in the part to be consolidated into Greater Osaka, namely: Higashinari and Nishinari. The five wards are to be known as: Himejima, Nakajima, Higashinari, Sumiyoshi, and Nishinari.

Himejima-ku is to comprise Dempo, Sagisu, Utajima, Chibune, Hiejima, Fuku and Kawakita.

Nakajima-ku is to comprise Nakatsu, Toyosaki, Nishi-Nakajima, Toyosato, Omichi, Shinjo, Nakajima, Kita-Nakajima and Kamitsu.

Higashinari-ku is to comprise Ikuno, Tsuruhashi, Nakamoto, Kamiji, Shoji, Joto, Enomoto, Namazue, Enami, Johoku, Furuichi and Shimizu.

Sumiyoshi-ku is to comprise Tennoji, Hirano, Kizure, Kita-Kudara, Minami-Kudara, Tanabe, Yosami, Nagai, Sumoyoshi, Suminoe, Auryu and Shikitsu.

Nishinari-ku is to comprise Imamiya, Tamade, Kohama and Tsumori.

From the point of view of the present Osaka city, there are two reasons for which the consolidation of the outlying districts into Greater Osaka was considered absolutely necessary; readjustment of the streets and sanitary improvement of outlying districts to prevent diseases. These two problems are not easy to solve, as their solution will require a considerable outlay of funds and a deal of inconvenience spread over a long period of operations. Nevertheless, they must be solved, for, should the present irregular development of the outlying districts continue, Osaka city will be literally choked by menacing diseases and by inconvenience in communications. As an organic community, Osaka must break through these walls to preserve its health. These considerations have led to the proposed plan of consolidation.

As for the districts to be consolidated into Greater Osaka, they will naturally get the benefit of the municipal improvements extended to them after they are consolidated. These self-governing communities are now requested by the home office, through the Osaka prefecture government, to reply as to whether they care to be consolidated into Greater Osaka and on what conditions they will join. Very little dissension is expected.

As soon as these districts make their reply, the home office will give formal consent to the plan of consolidation and preparations for creating Greater Osaka will be made at once. It is believed that, from April, 1925, Osaka will announce its expansion into Greater Osaka.

There are several interesting facts which should be noted here in connection with the creation of Greater Osaka. Greater Osaka will have within its limits 5,132 *chobu* (a *chobu* is equal to 2.45 acres) of rice fields and 1,912 *chobu* of track gardens. The city will not only be a manufacturing and commercial centre, but eill be an agricultural city as well. About 8,000 farming families will live in the city. About 86,000 *koku* (a *koku* is equal to about 40 bushels) of rice and 9,000 *koku* of wheat will be produced. Being adjacent to Osaka city, the outlying districts produce a considerable amount of vegetables, chickens, eggs and other farm produce There will, therefore, be 6,600 families engaged in chicken raising, with 240,000 chickens, yielding annually 6,430,000 yen. These farming districts will be converted, in a space of five or ten years, into city streets or manufacturing sites, according to how fast Greater Osaka develops.

Residence Quarters

According to the plans in the minds of the promoters of Greater Osaka, purely agricultural districts in the highlands, east of Osaka city, are sites for future residence districts, as a way of relieving the present crowded and insanitary condition of residence houses in the city.

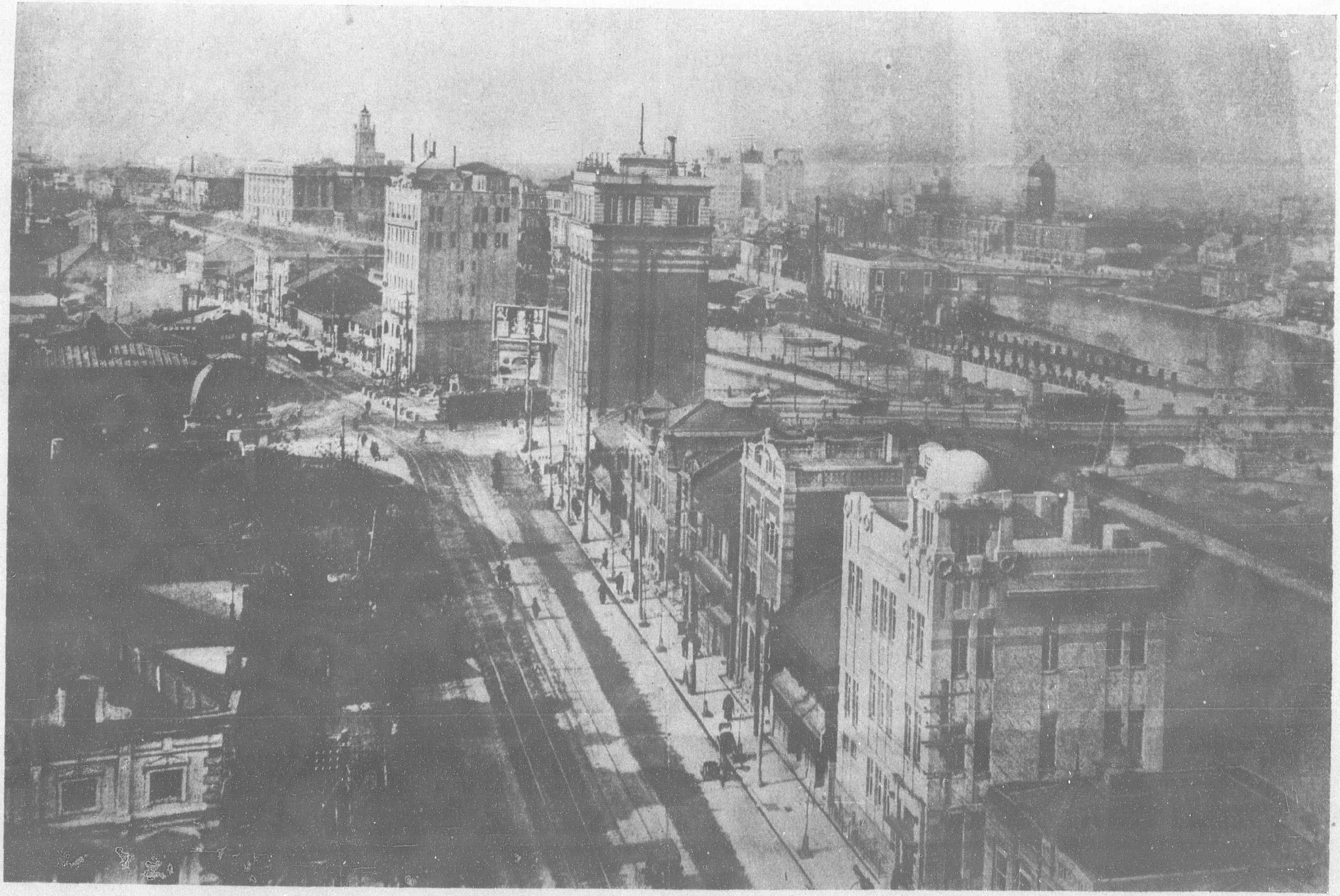
The regions along the Yodo and Kizu rivers are especially selected as sites for big and special factories which will be removed from their present sites within the present city limits, thereby increasing the efficiency of the factories and at the same time safeguarding the lives of the people of the city, who are at present tormented by the smoke, noise and malodours of the factories.

Improvement of sanitary conditions in the city was one of the objects for which Greater Osaka was planned. Osaka's death rate is beyond description. Its rate of 22.32 per thousand of the people of Osaka is the highest of the six largest cities in Japan, except Nagoya. The rates in some of the outlying districts are extraordinary. In Ikuno-mura, it is 57.03, in Toyosaki-machi, 33, and in Imamiya-machi, over 38.

An example of improvement is shown by Imamiya, where the rate in the part of Imamiya which was incorporated into the present Osaka city some years ago is smaller by 11 than that of Imamiya-machi, which was left behind, but which is now to be consolidated into Greater Osaka. In Tennoji, the difference is 1.4. By rates similar to these examples, the sanitary and health conditions of the outlying districts will be improved.

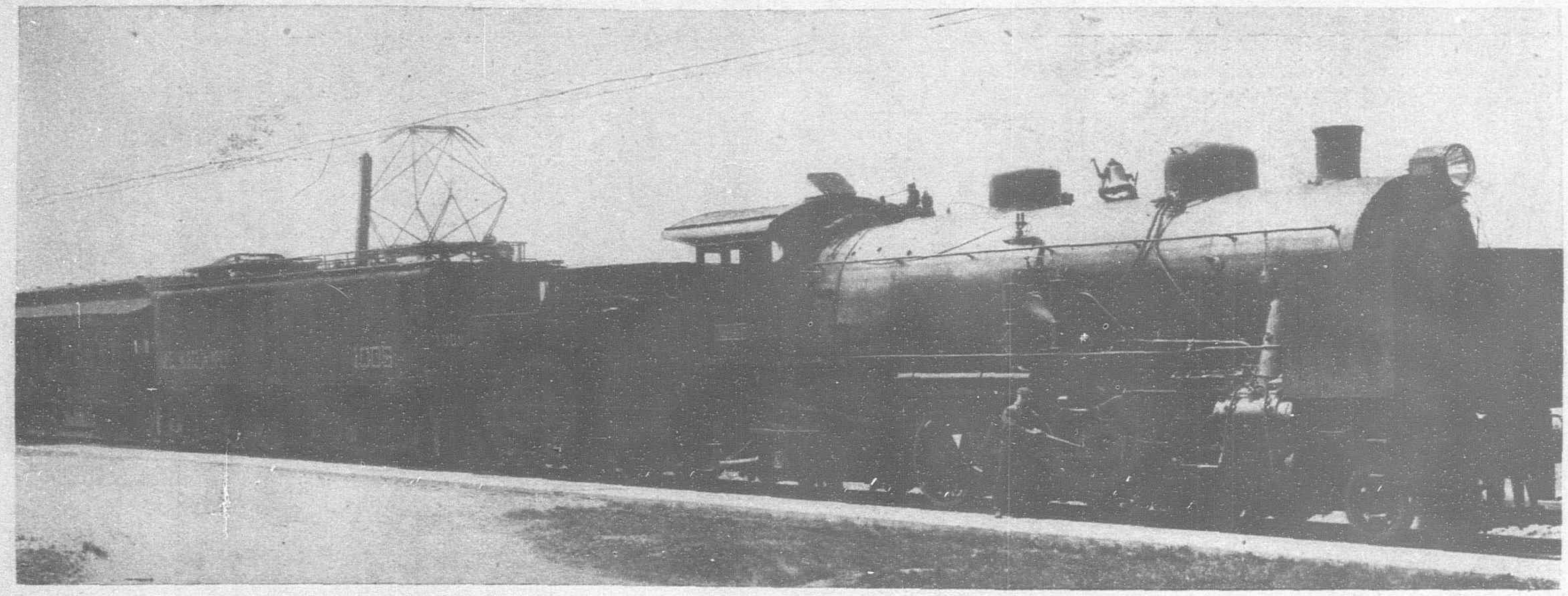
All these and other improvements which may be enumerated can be brought about only by the people of the city and of the districts to be incorporated into Greater Osaka addressing themselves seriously to the great task before them. The increase of

(Continued on page 19.)



BIRD'S-EYE VIEW OF THE CENTRE OF GREATER OSAKA

Large Buildings Shown in the Photograph Are: From left: Bank of Japan, Nakanoshima, City Hall, Nadaman Hotel, Kitahama, Mainichi Building seen behind Nadaman, Central Public Hall, Nakanoshima, seen next to Mainichi Building, Kitahama Building, Dojima Building, Oye Building, seen far beyond, Bankers' Club in Nakanoshima, Appellate Court across Dojima River, Shizuka Company seen in front on the right, and Kitahama Share Market in front on the left.



American Locomotive Co.—General Electric Co. Test of S.M.R. 190-Ton 3-Cylinder Locomotive Using 150-Ton 3,000 volt Mexican Locomotive for Regenerative Load

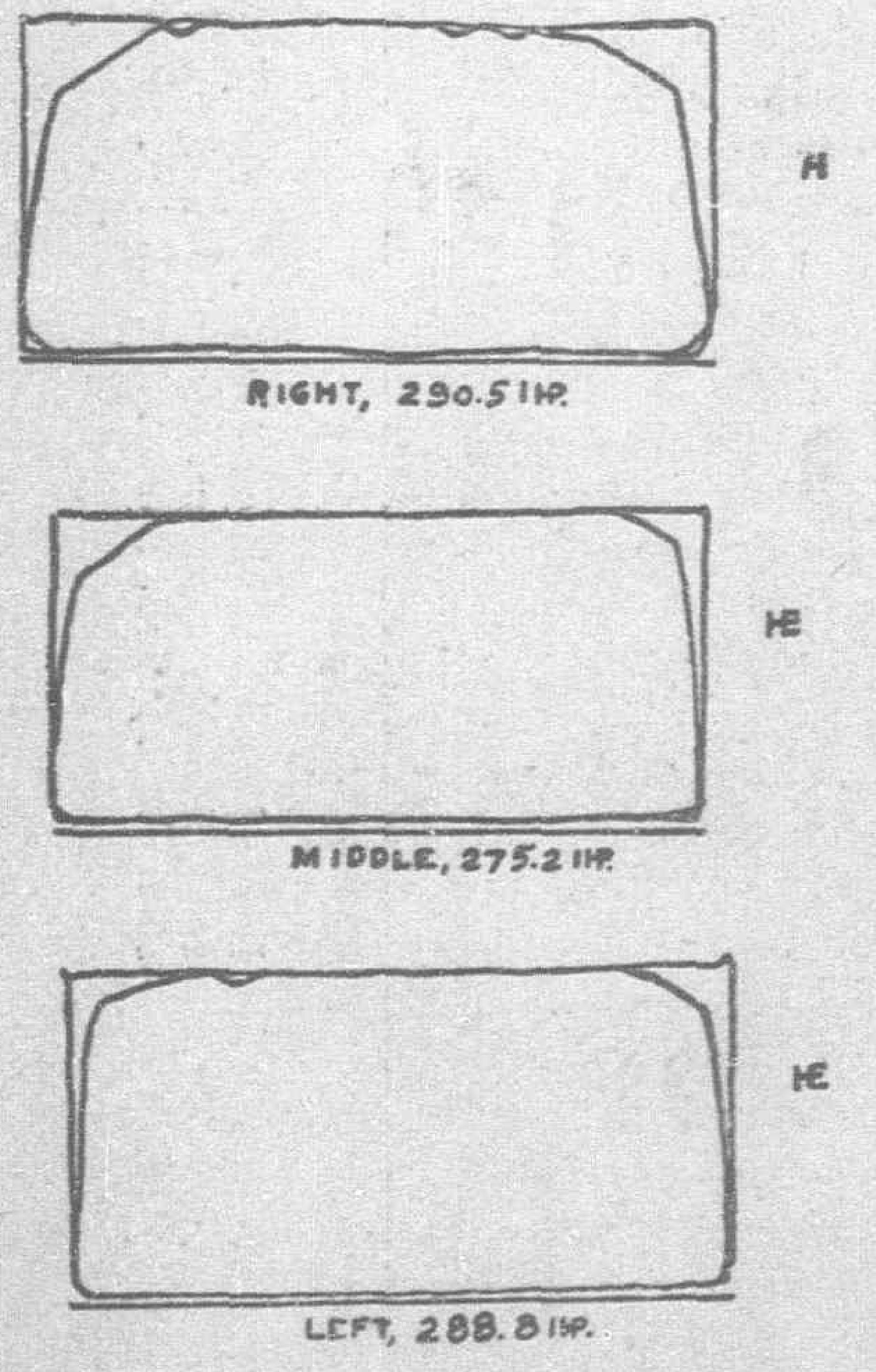
Test of Three-Cylinder Locomotive for the South Manchurian Railway

An account of recent tests on a three-cylinder locomotive for the South Manchurian Railway, conducted on the test track of the General Electric Co., at Erie, Pa., with interesting data relative to the performance of these engines. It includes also a brief description of these locomotives.

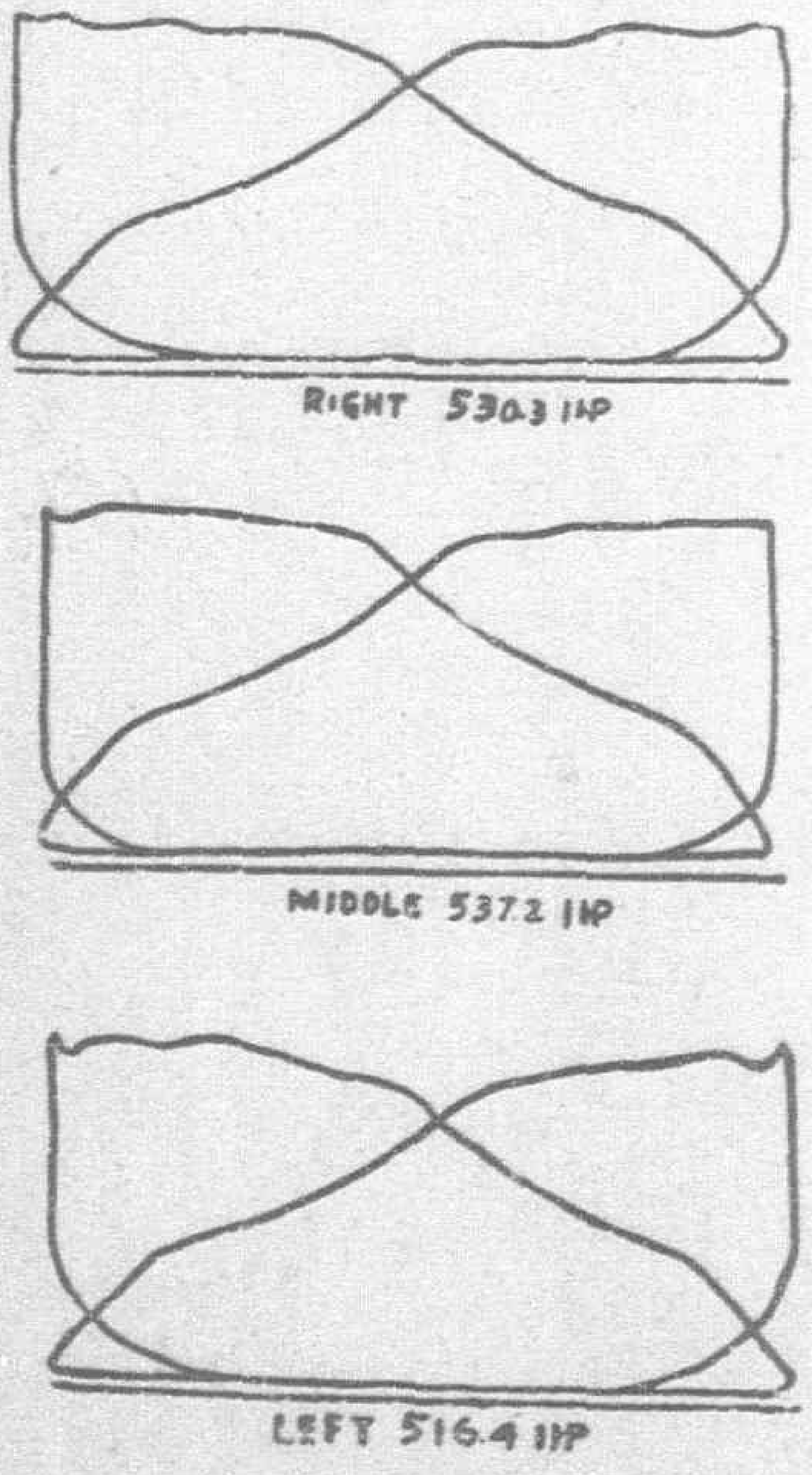
The American Locomotive Co., recently completed five locomotives of the three-cylinder mikado type, for the South Manchurian Railway. Before the new engines were shipped abroad, they were tested in the novel manner recently introduced by the General Electric Co., and the American Locomotive Co., using an electric locomotive equipped with the regenerative braking feature as a means of registering the data of the performance. The tests were conducted on the test track of the General Electric Co., at Eire, Pa.

The electric locomotive used in the tests was one of ten units built by the General Electric Co., and the American Locomotive Co., for the Mexican Railway Co., Ltd., which at that time was ready for shipment. This locomotive was designed to operate from a 3,000-volts, direct-current trolley and was equipped with the regenerative braking feature for the purpose of holding back trains on the 4 per cent. grades between Mexico and Vera Cruz.

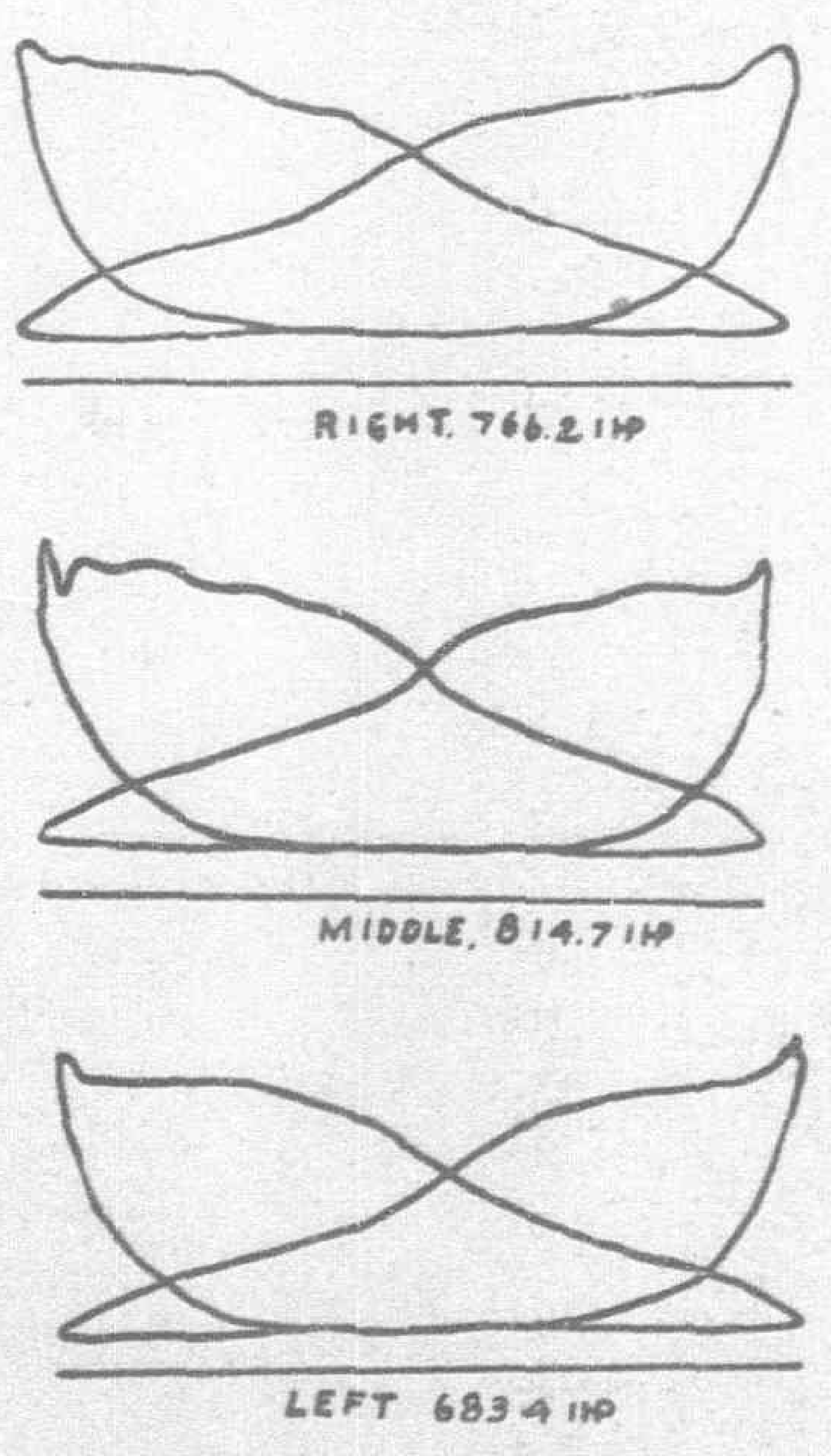
Because of the accuracy of electrical instruments, it was possible to determine the drawbar pull exerted by the steam engine much more accurately than by the use of mechanical measurements. In order to calculate the load for each run, recording and indicating instruments were used reading the total line current, speed and volt-



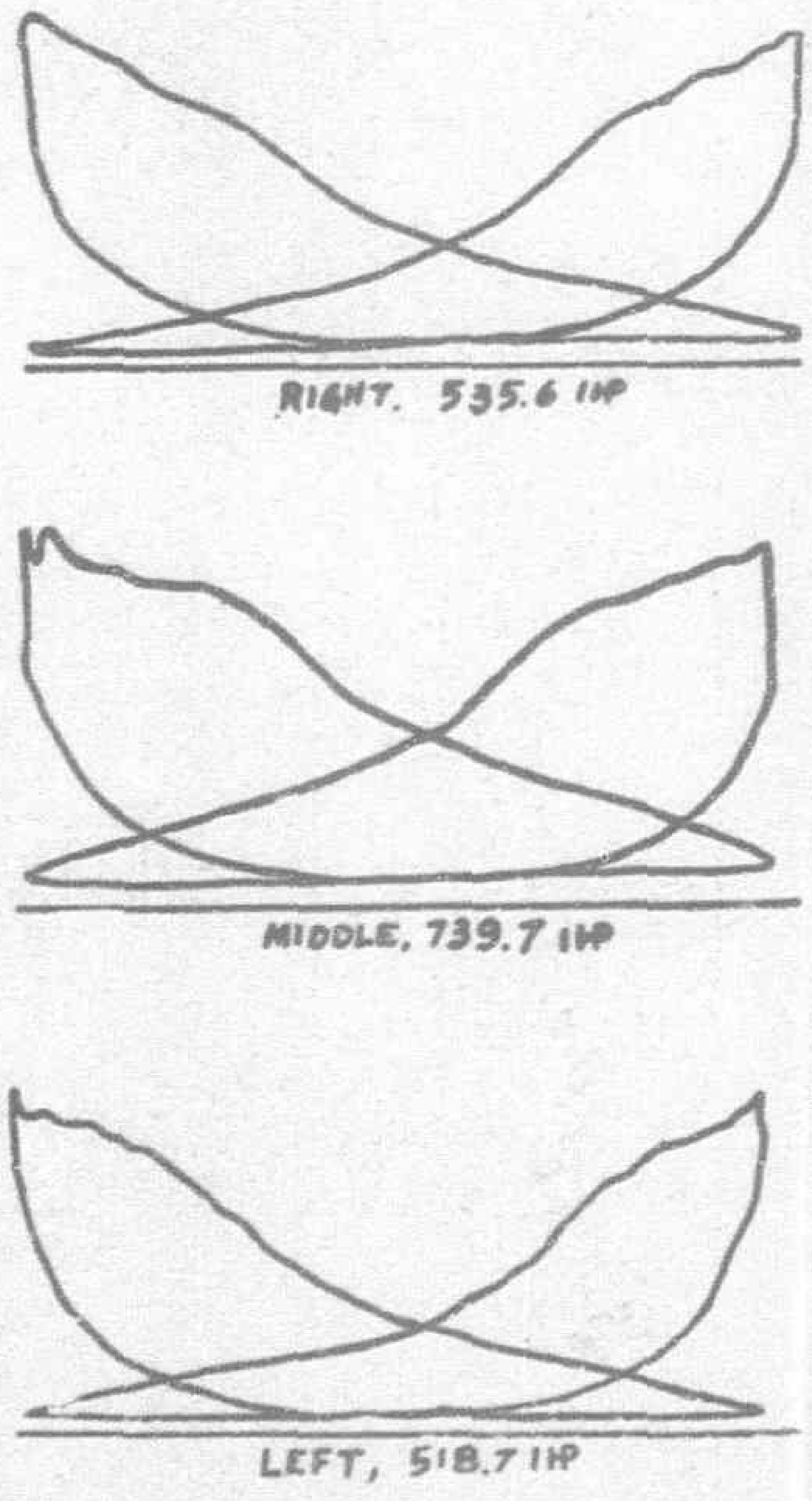
Boiler Pressure, 180: Speed, 5.45 M.P.H. Full Gear. Card, 1-5: I.H.P., 854.5



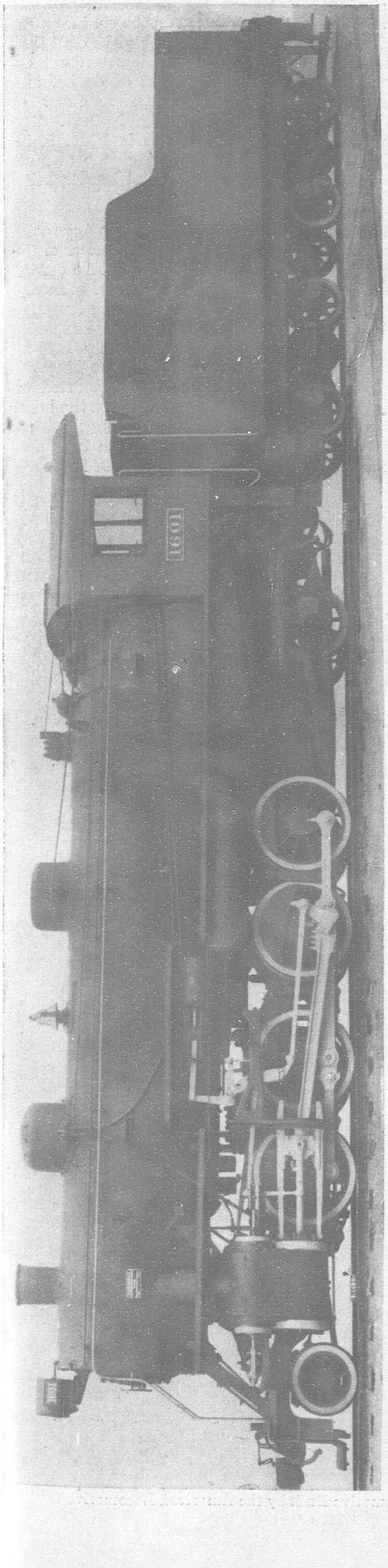
Boiler Pressure, 180: Speed, 14.76 M.P.H.: 50% cut-off: Card, 3a-4: I.H.P., 1583.9



Boiler Pressure, 178: Speed, 34 M.P.H.: 50% cut-off: Card, 9-1: I.H.P., 2284.3



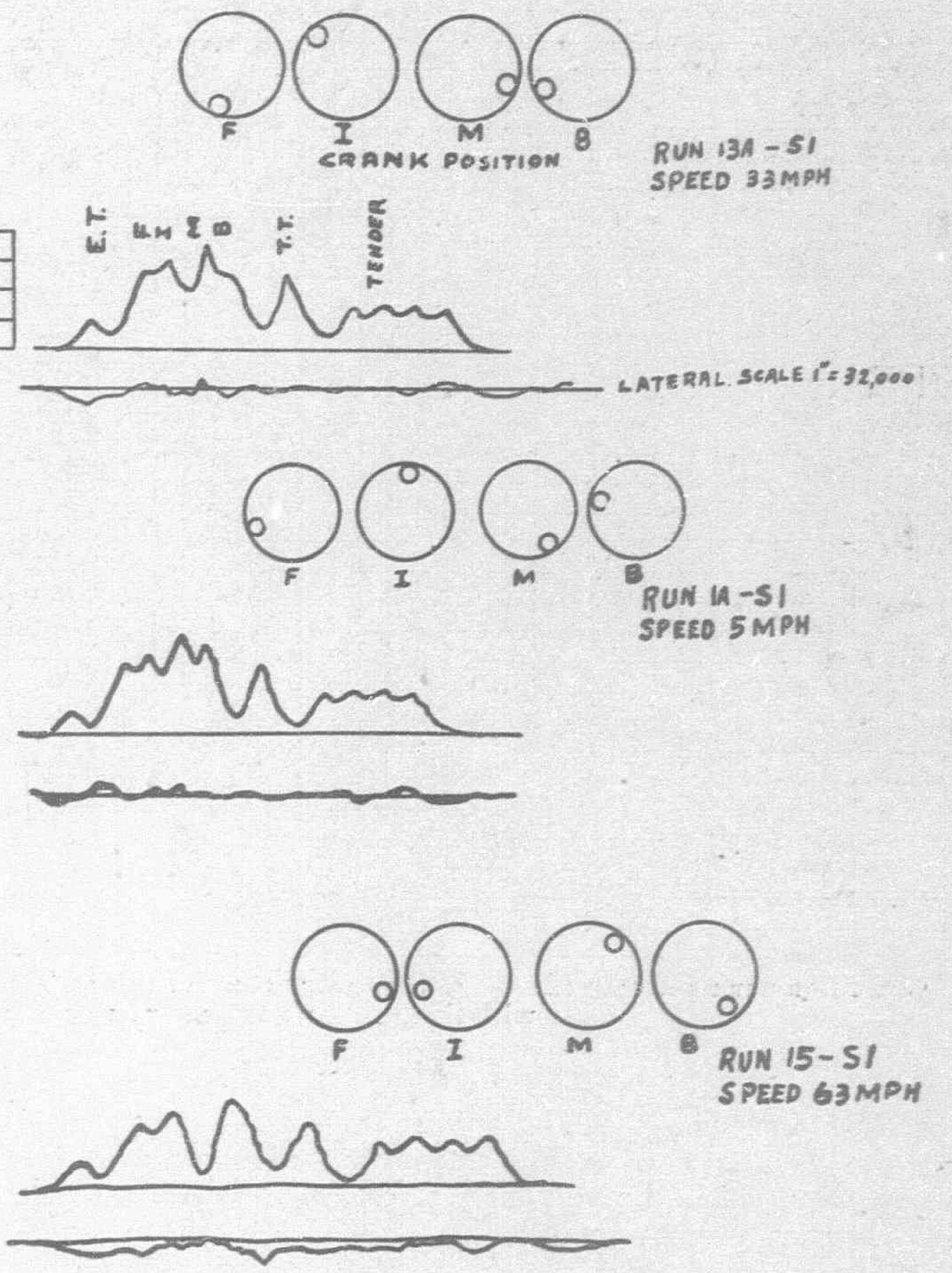
Boiler Pressure, 179: Speed, 33.4 M. P. H., 33% cut-off: Card 11-2: I.H.P., 1794.



3-Cylinder 190-Ton Locomotive Built by the American Locomotive Co. for the S.M.R.

ages. Speed was indicated on the tachometer in the cab and was also checked by an electrical instrument recording wheel revolutions. From the characteristic curve of the motors it was possible to calculate accurately the electrical losses in the locomotive. The friction losses of the locomotive were obtained by experimental runs. Corrections were also made for grade and curvature.

An interesting check was made on the calculations by using one electric locomotive motoring and the other regenerating giving in effect a pump-back test in which the sub-station supplied the losses. A number of runs were made at between 5 and 28 miles per hour. By means of voltmeter and ammeter readings, the total output of the locomotive when regenerating was calculated, and making allowance for known losses and compensation for friction and curve losses, the actual drawbar pull was determined.



Otheograms

Although the engine was tested without the customary "breaking in," there was no indication of heated bearings at any time, even when the speed was forced up to 63 miles per hour, which is equivalent to a piston speed of 1,700 feet per minute. At this speed there was no indication of rough riding in the cab and the records of the otheograph indicate remarkable lateral steadiness, or freedom from nosing, a maximum lateral thrust of 5,000-lbs. being observed. The accompanying otheograms illustrate the track reactions of 5 to 33 miles per hour, from which it may be noted that the lateral rail thrust at 33 m.p.h. is 3,000-lbs., indicating that the 5,000-lbs., obtained at 63 m.p.h. represents that the engines have great lateral steadiness at this speed.

The rapid acceleration of the engine as compared with the two-cylinder type was just as much in evidence in this engine as in the previous three-cylinder engines built, the full stroke cards showing admirable starting conditions.

A slight irregularity in the valve setting of all the cards will be noted, but it must be remembered that these cards were taken with the setting just as turned out from the shop, there being no opportunity to make the final adjustments before the tests. Even so, the specimen cards show very good equalization of power under the circumstances, and there seems little doubt but that this engine is the most remarkable locomotive of its size and general proportions that the American Locomotive Co., has built both as regards power and flexibility. It is unusual to find a locomotive primarily designed for freight service, with small wheels and long maximum cut-off, able to exceed the diameter-speed, yet this engine, with only 54-in. diameter wheels, easily attained a speed of 63 miles per hour with only about two miles in which to accelerate.

By reference to the accompanying tables and charts the results of the tests will be more fully understood. One of the tables gives the weights, dimensions and proportions of the three-cylinder engines. Another table contains data compiled from the indicator cards and from other recording mechanisms. Still another chart furnishes a comparison of the tractive effort of the three-cylinder engine with that of a two-cylinder locomotive having 25½-in. by 26 in cylinders and in addition shows the indicated horse-power as compared with the tractive effort. The other charts show otheograms and specimen indicator cards at various speeds.

As previously mentioned the new locomotives for the South Manchuria Railway are of the three-cylinder mikado (2-8-2) type. They operate on a track having a gauge of 4-ft. 8½-in. and use bituminous coal for fuel. The cylinder are 22½-in. by 26-in. and are arranged like those of locomotive No. 5,000. The three piston

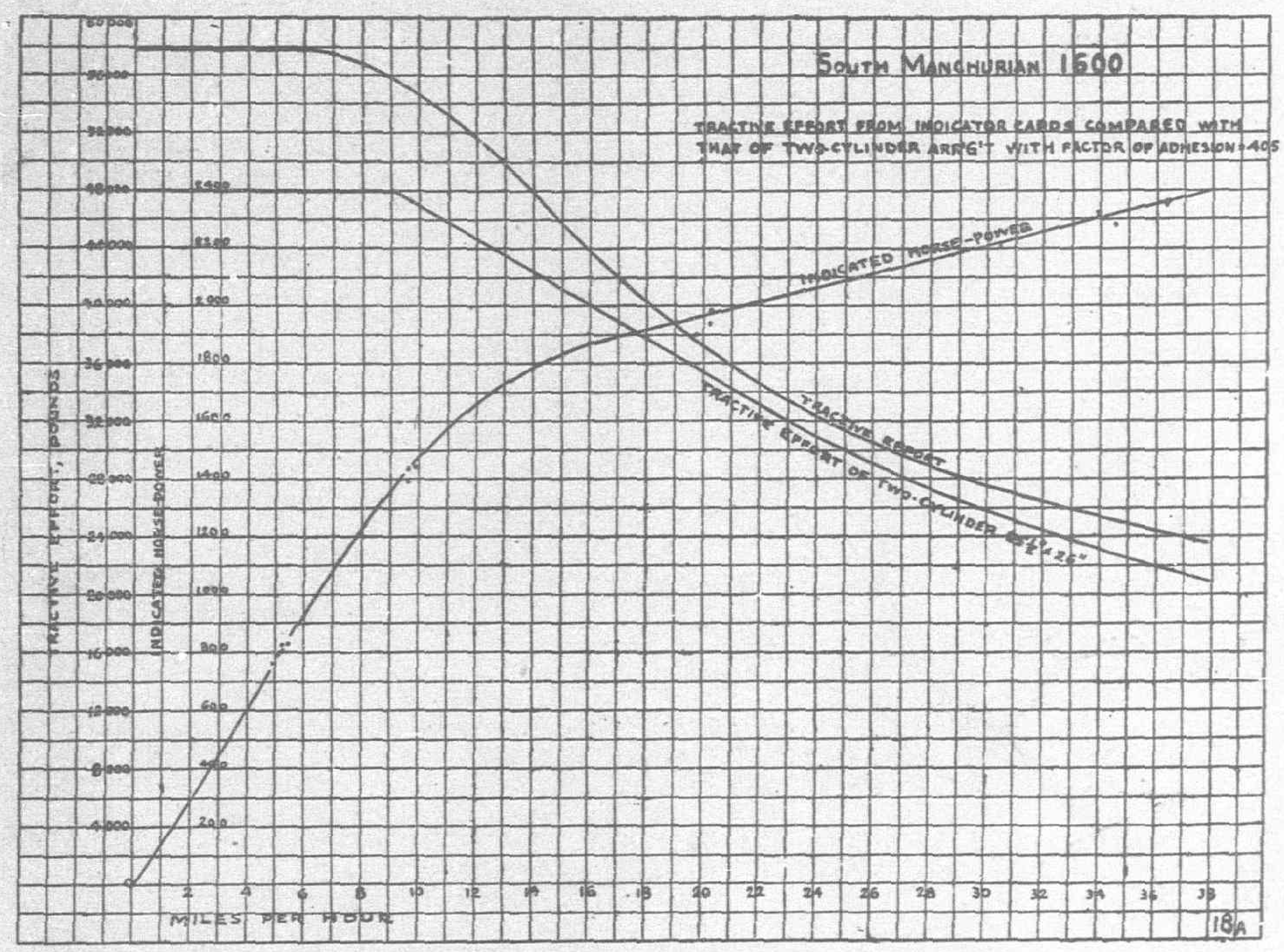


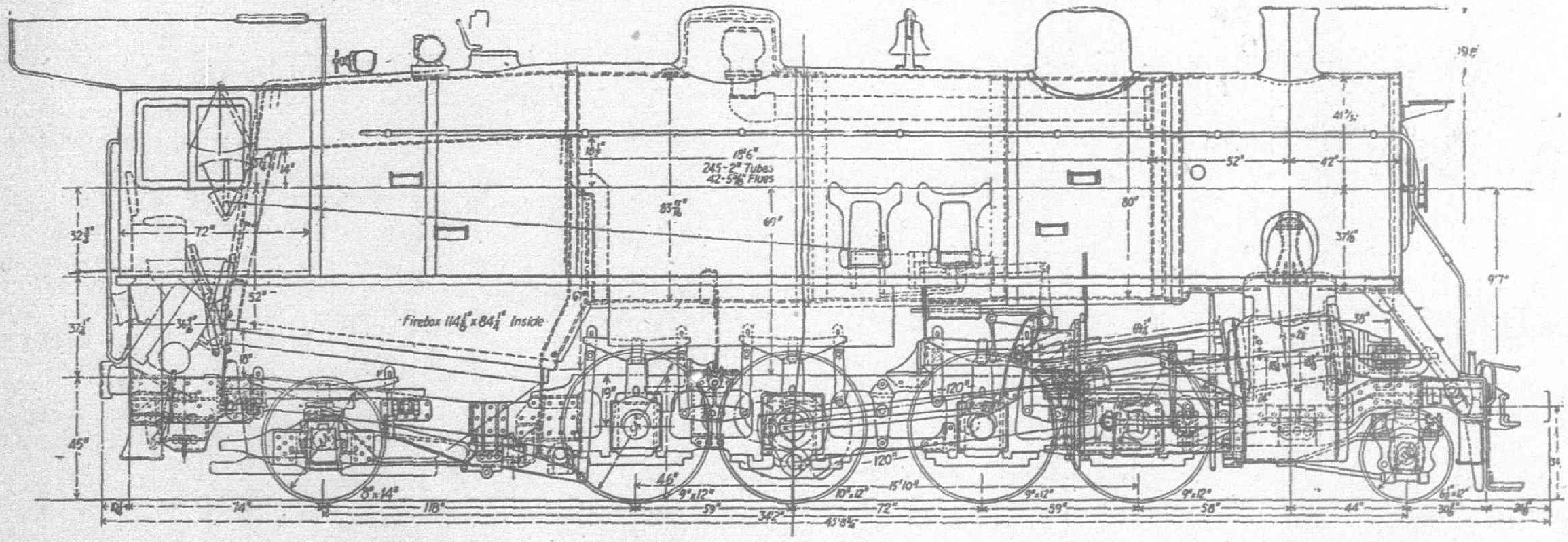
Chart Comparing Tractive Effort of South Manchuria Railway Three-Cylinder Locomotive with that of a Two-Cylinder Engine

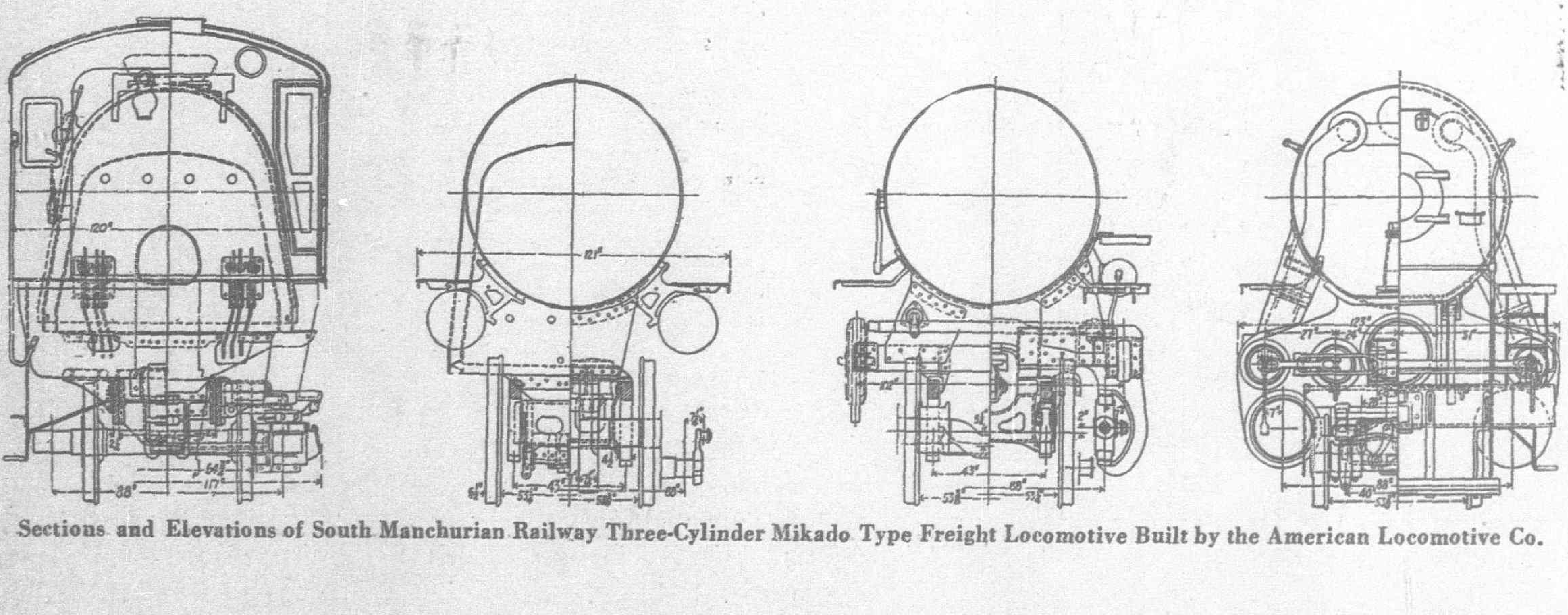
valves are 12-in. in diameter with a maximum travel of 6-in., a lead in full gear of $\frac{3}{16}$-in., an outside lap of 1⅛-in. and no exhaust clearance. The two outside valves are operated by Walsehaert valve gear which through interconnecting levers also operate the third, or inside piston vale.

The engines weight 268,000-lbs. in working order, 25,000-lbs. being carried on the engine truck, 48,800-lbs., on the trailing truck and 194,200-lbs., on the driving wheels. The tenders weigh 135,000-lbs., making the total weight of engine and tender 403,000-lbs. With a tractive effort of 56,000-lbs. the factor of adhesion is 3.47. The driving and the rigid wheel base is 15-ft. 10-in. and the total wheel base of the engine alone is 34-ft. 2-in., that of the engine and tender being 62-ft. 7¼-in.

The boilers are of the straight top type with wide radial stayed fireboxes. The diameter of the first ring is 80-in., and the steam pressure carried is 180-lbs. They are fitted with 245 2-in. tubes and a superheater having 45 5⅜-in. flues, the length of the tubes and flues being 18-ft. 6-in. and the spacing ¾-in. The fireboxes are 84¼-in. wide by 114⅛-in. long, with a grate area of 66.8 sq. ft. They are fitted with sectional brick arches supported on arch tubes. The total heating surface of the boiler is 3,695 sq. ft., that of the tubes being 2,361 sq. ft., flues 1,088 sq. ft., firebox and arch tubes 246 sq. ft. and the superheating surface is 945 sq. ft.

The driving wheels are 54-in. outside diameter with 10-in. by 12-in. journals for the main wheels, the others being 9-in. by 12-in. The engine truck wheels are 33½-in. in diameter with 6½-in. by 12-in. journals, and the trailer truck wheels are 44-in. in diameter with 8-in. by 14-in. journals. The engine truck is of the Player type and the Cole-Scoville trailer truck is used. The main and side rods are of chrome vanadium steel and the driving boxes, engine truck and trailer truck wheel centers are of cast steel.





Sections and Elevations of South Manchurian Railway Three-Cylinder Mikado Type Freight Locomotive Built by the American Locomotive Co.

In addition to the above the engines are equipped with Viloco bell ringers, Viloco double sanders, Franklin power grate shaker, and Elvin mechanical stokers. They are also fitted with Franklin pneumatic fire doors, Franklin unit safety drawbars and radial buffers, Pyle National electric headlight equipment and the Chambers outside connected throttle valves. Some of the other equipment includes Okadee blow-off cocks, blower valves, tender hose couplings and water gauges, Also staybolts, Ever-lasting safety valves and Simplex injectors. The Ashcroft steam gauge is used with Nathan lubricators, Elvin grease cellars, Paxton Mitchell piston rod and valve stem packing, and the valves are operated by means of Alco power reverse gears. Gibson retaining rings are used and one engine is fitted with a Superior flue blower.

The tenders are of the eight-wheel type with arch bar trucks and rectangular water bottom cisterns having a capacity for 6,000 gallons of water and 12 tons of coal. The tender frames are built of steel channels, and the cabs are of the same design as those used in this country.

DIMENSIONS, WEIGHTS AND PROPORTIONS OF THREE-CYLINDER LOCOMOTIVES FOR SOUTH MANCHURIAN RAILWAY

Gauge	4-ft. 8½-in.
Service	Freight
Type	Mikado
Fuel	Bit. Coal
Cylinders, three, diam. and stroke	22½-in. by 26-in.
Valves, piston, diam	12-in.
Max. travel	6-in.
Lead in full gear	3/16-in.
Outside lap	1⅛-in.
Exhaust clearance	0
Weights :	
On drivers	194,200-lbs.
On engine truck	25,000-lbs.
On trailer truck	48,800-lbs.
Total engine	268,000-lbs.
Tender	135,000-lbs.
Total engine and tender	403,000-lbt.
Wheel base :	
Driving	15-ft. 10-in.
Rigid	15-ft. 10-in.
Engine	34-ft. 2-in.
Engine and tender	62-ft. 7¼-in.
Wheels, diam :	
Engine truck	54-in.
Driving	33¼-in.
Trailing truck	45-in.
Journals, diam. and length :	
Main	10-in. by 12-in.
Others	9-in. by 12-in.
Engine truck	6½-in. by 12-in.
Trailing truck	8-in. by 14-in.
Boiler :	
Type	Straight top
Pressure	180-lbs.
Diam. first ring	80-in.
Tubes, number and diam.	245 2-in.
Flues, number and diam.	42 5⅜-in.
Tubes and flues, length	18-ft. 6-in.
Spacing	¾-in.
Firebox :	
Length	114⅛-in.
Width	84¼-in.
Grate area	66.8 sq. ft.
Heating surface :	
Firebox	217 sq. ft.
Arch tubes	29 sq. ft.
Tubes	2,361 sq. ft.
Flues	1,088 sq. ft.
Total	3,695 sq. ft.
Superheating	945 sq. ft.
Tractive effort	56,000-lbs.
Factor of adhesion	3.47
Tender :	
Type	Eight wheel
Capacity coal	12 tons
Capacity water	6,000 gals.
Wheels, diam.	33¼-in.
Journals	5-in by 9-in.

An Useful Propeller Publication

Having regard to the number of enquiries which are constantly being received by the Editors of yachting, motor boating and other periodicals dealing with steam or motor craft, from owners who for one reason or another are dissatisfied with their propelling gear, it is extremely interesting to note that a most useful pamphlet has recently been prepared on the subject by John I. Thornycroft & Co., Limited.

This firm having had years of experience in the design and manufacture of propellers for all classes of service in various parts of the world, is in a position to offer advice of a distinctly reliable nature. The booklet covers in a clear and concise manner the more common causes for dissatisfaction on the part of owners who, rightly or wrongly, have reason to think that they are not getting satisfactory results from their craft.

GREATER OSAKA

(Continued from page 14)

area alone will not make for a great city. There must be modern civic improvements carried out in order to make Greater Osaka worthy of its name.

Broader Streets

Side by side with the proposed plan of Greater Osaka, the city has a plan to construct broad streets which will run in four directions, in order to relieve the present congestion of traffic. The narrowness of the streets in Osaka, as in other cities in Japan, has been an obstruction to the proper development of modern enterprises in industry as well as in other lines of human activity. Moreover, if a natural accident, such as an earthquake which would shake the city from its foundations, should visit the city followed by a big fire (Osaka is famous for fires), the present condition of the streets is entirely unsatisfactory in affording the people sufficient right of way to escape to places of safety.

Already plans have been mapped out by the city authorities for the construction of wide streets, which will be carried out as soon as the funds needed is secured. With the wealth and latent economic and financial strength of the city, there is no reason why the plans mapped out cannot be carried out, if the people address themselves seriously to the problem.

Rapid-Transit Means

There is also a plan of constructing rapid-transit means of travel in the city, either elevated or underground, in order to relieve the present street car congestion. The suburban electric car lines, such as the Hanshin, Hankyu, Nankai, Keihan and others in existence as well as those planned, are contemplating improving their service by reconstructing the lines in the city. Their plans have not progressed very fast as yet, due to legislative difficulties presented by the municipal assembly, but as soon as these and other natural impedimenta are overcome, means of locomotion to and from Osaka will be greatly improved.

The last, but not least, thing to be noted is the fact that the imperial railway office is now carrying out the plan of rebuilding Osaka station at Umeda into the finest railway station in the Orient. Acres of property adjoining the present station at Umeda have been purchased, the buildings standing thereon are being demolished, and engineering work is fast progressing. Within a few years Osaka's front gate will be decorated with a first class railway station worthy of the largest city in the Orient.—*Osaka Mainichi.*

Motive Power Development on the Peking-Suiyuan Railway

By J. K. Wong, Peking-Suiyuan Railway

THE Peking-Suiyuan railway was formerly known as the Peking-Kalgan, and it is not unlikely that its name will be again changed as the line is further extended. This line represents the first piece of work in railway construction carried out under exclusive Chinese engineering supervision. It was well done. The following tables, 1 and 2, show respectively the development of the main line and its branches for facilitating the promotion of local and mining industries :--

TABLE 1.

Sections.	Construction Commenced.	Construction Completed.	Length in Miles.	Traffic Opened.
Peking-Kalgan... ...	Oct. 1904	Sept. 1908	134.0	Sept. 1908
Kalgan-Fengchen ...	Sept. 1908	Sept. 1915	135.0	Sept. 1915
Fengchen-Suiyuan ...	Aug. 1919	April 1921	149.0	May 1921
Suiyuan-Paotow ...	Jan. 1921	Dec. 1922	91.5	Dec. 1922

TABLE 2.

Sections.	Construction Commenced	Construction Completed	Length in Miles	Traffic Opened	
Peking-Mentoukou ...	Mar. 1907	Sept. 1908	16.7	Sept. 1908	Coal
Round-Peking City ...	June, 1915	Dec. 1915	9.5	Jan. 1916	
Tatung-Kouchen, Shansi	April 1917	July, 1917	12.3	Sept. 1917	Coal
Shüanhwa-Shuimo ...	Oct. 1917	Dec. 1917	5.4	Jan. 1918	Iron ores

Thirty-three miles from the Peking station is the Nankow-Pass, 12 miles long, which represents typical mountain construction work with sharp curves of 600 feet in radius, steep gradients of 1 in 30 and tunnels built on incline and with curvatures. The operation of traffic through this pass necessitates the use of powerful locomotives.

TABLE 3.—MOUNTAIN LOCOMOTIVES.

Item No.	No. of Engines	Type of Engines.	Builders of Engines	Maximum Tractive Power	Weight in Work Order	Year of Adoption	Particulars
1	4	0-6-6-0	North British Loco. Co.	46,407-lbs.	216,000-lbs.	1908	Saturated steam. Air brakes.
2	6	Shay	Lima Loco. Wks.	44,115	176,000	1909	,, ,, ,, ,, Obsolete
3	4	2-4-4-2	Baldwin Loco. Works.	27,400	163,000	1911	,, ,, ,, ,, ,,
4	7	2-8-8-2	American Loco. Company	54,357	290,000	1914	Superheated steam. Air brakes.
5	7	2-8-8-2	American Loco. Company	92,500	446,000	1922	,, ,, ,, ,,

Mallet locomotives of the 0-6-6-0 type, with a maximum tractive power of 46,407 pounds, built by the North British Locomotive Company were put into operation on the pass in 1908 and the following year Shay geared engines with a maximum tractive power of 44,115 pounds, built by the Lima locomotive works were introduced. As traffic was fast increasing more Mallets built by the Baldwin locomotive works with 2-4-4-2 wheel arrangement and with a maximum tractive power of 27,400 pounds were purchased in 1911 for pushing passenger trains up grade.

As the line was further extended into the rich north-eastern plateau, hitherto isolated from other parts of the country for lack of transportation facilities, great cargoes of grain, wool, hides and coal found easy access to the world's market, resulting in a rapid increase of passenger and freight traffic which has continuously demanded larger motive power capacity for pushing heavier and longer trains over the mountain pass. In 1914, Mallets built by the American Locomotive Co., of the 2-8-8-2- type with a maximum tractive power of 54,375 pounds were purchased and in 1922 more Mallets also built by the American Locomotive Co., of the 2-8-8-2 type, but with a maximum tractive power of 92,500 pounds were added.

The last named represent the largest locomotives in operation on Chinese railways to-day. They were built by the American Locomotive Co., to meet the exacting requirements of the Peking-Suiyuan line and are equipped with modern appliances for economical operation and utilization of comparatively low grade of bituminous coal. These huge locomotives require such a great amount of steam to develop their full power that coal has to be burnt at a terrific rate which is considered hardly economical to be done by hand firing and, therefore, the Elvin underfeed mechanical stoker have been installed. For guiding the engine drivers to run these heavy engines at safe limitation of speeds upon the difficult track condition and structures at the mountain pass, automatic speed recording devices are employed. These engines are equipped with superheaters supplied by the Locomotive Superheater Company of New York and latest type of the American Westinghouse ET No. 6 air brakes suitable for operating on the automatic system as well as straight air. Figure 1 shows this type of Mallet engines and Figure 2 shows the lighter type. The particulars of the engines so far mentioned which operate on the mountain division, are shown in table 3.

Turning to the motive power for passenger and freight service, switching engines built by the American Locomotive Co., Baldwin Locomotive Works and a few from the Tongshan Locomotive Works with tractive power ranging from 11,454 pounds to 21,360 pounds were introduced, in the years 1906 to 1909. All these engines are of the tank type. Growth of traffic required more speed for passenger trains and in 1908 to 1909 Moguls were purchased ; these engines develop a maximum tractive power of 22,093 pounds with 60" drivers. Switchers and Moguls mentioned above constituted the early source of motive power for the operation of the line which power was soon found to be inadequate to meet the growing volume of traffic. Therefore, modern engines with greater capacities have steadily taken the place of above, which until to-day are being used extensively for shunting in station yards and terminals only. Table 4 shows particulars of these engines.

In 1912, Consolidation type locomotives developing a maximum tractive power of 31,820 pounds were put into operation ; in 1914,

TABLE 4.—SWITCHING LOCOMOTIVES.

Item No.	No. of Engines	Type of Engines.	Builders of Engines	Maximum Tractive Power	Weight in Work Order	Year of Adoption	Particulars
1	4	Tank—2-6-2	Baldwin Loco. Works	11,454-lbs.	105,000-lbs.	1906-7	Saturated steam. Steam brakes.
2	3	,, 0-6-0	American Loco. Company	14,344	96,500	1909	,, ,, ,, ,,
3	2	,, 2-6-2	Baldwin Loco. Works	18,800	120,000	1909	,, ,, ,, ,,
4	2	,, 2-6-2	North British Loco. Company	11,900	83,000	1908	,, ,, ,, ,,
5	17	,, 2-6-2	Baldwin Loco. Works	21,360	111,000	4-1909 3-1920 10-1921	,, ,, Air, brakes
6	10	Mogul—2-6-0	Baldwin & Tongshan	22,093	123,000	6-1908 4-1909	,, ,, ,, ,,

AMERICAN LOCOMOTIVES ON THE PEKING-SUIYUAN RAILWAY

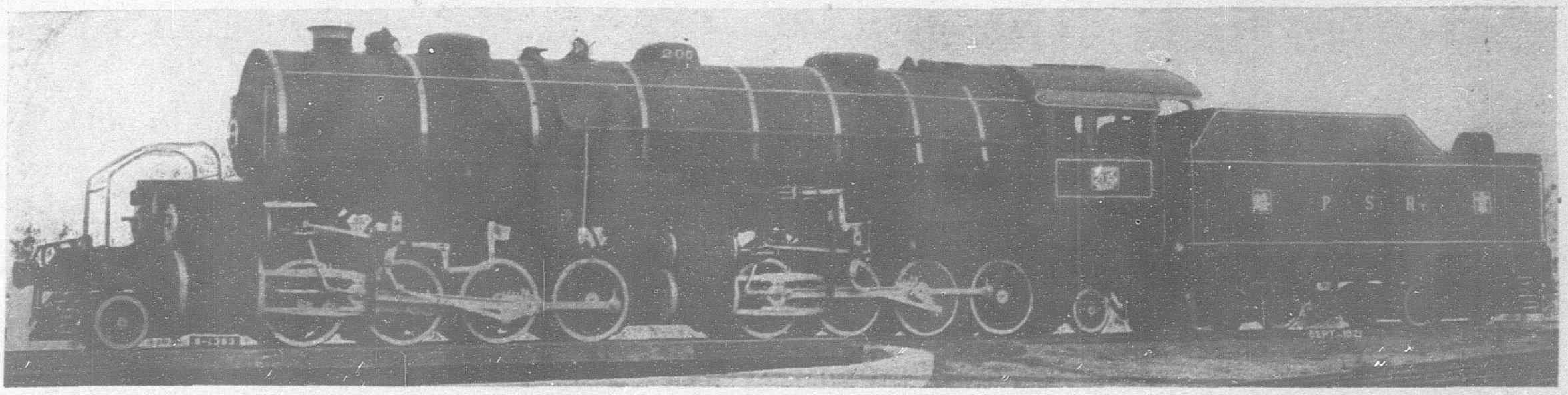


Fig. 1.—8-Wheeled Tender, Heavy Mallet Type

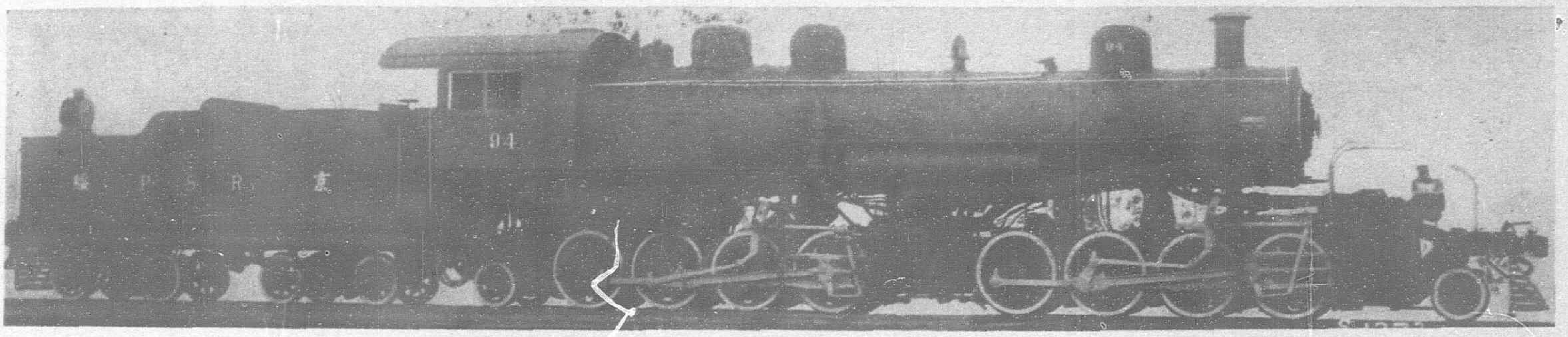


Fig. 2.—8-Wheeled Tender, Light Mallet Type

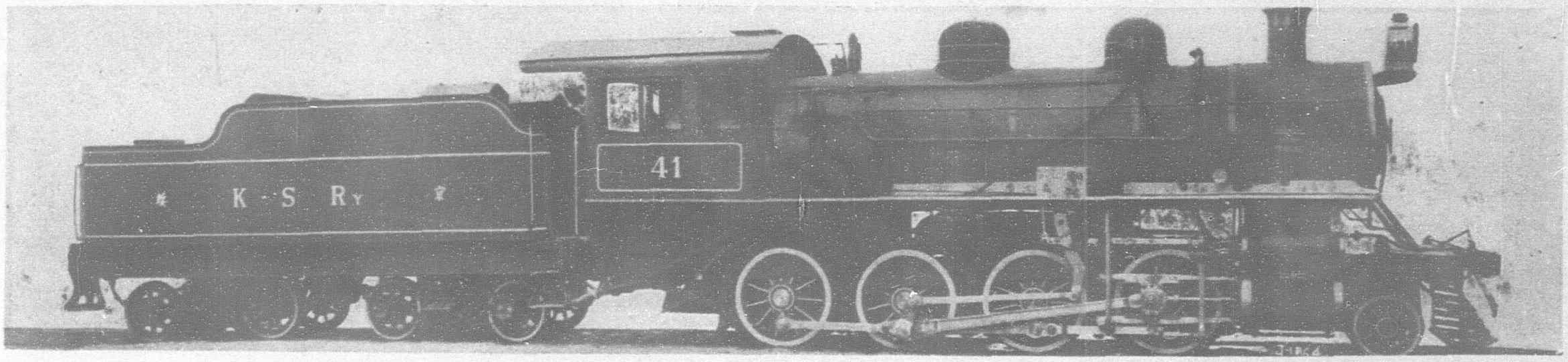


Fig. 3.—8-Wheeled Tender, Consolidation Type

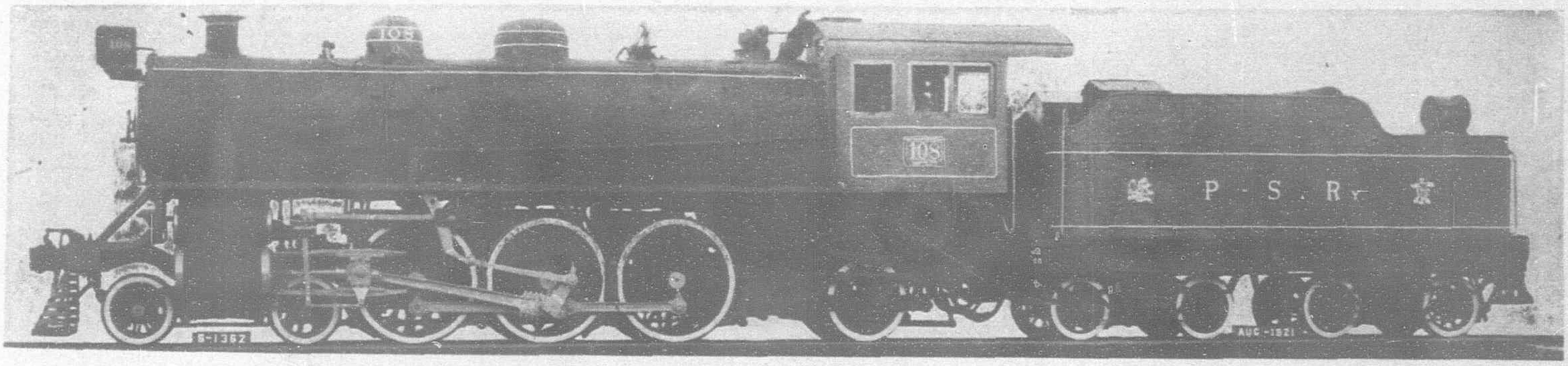


Fig. 4.—Pacific Type

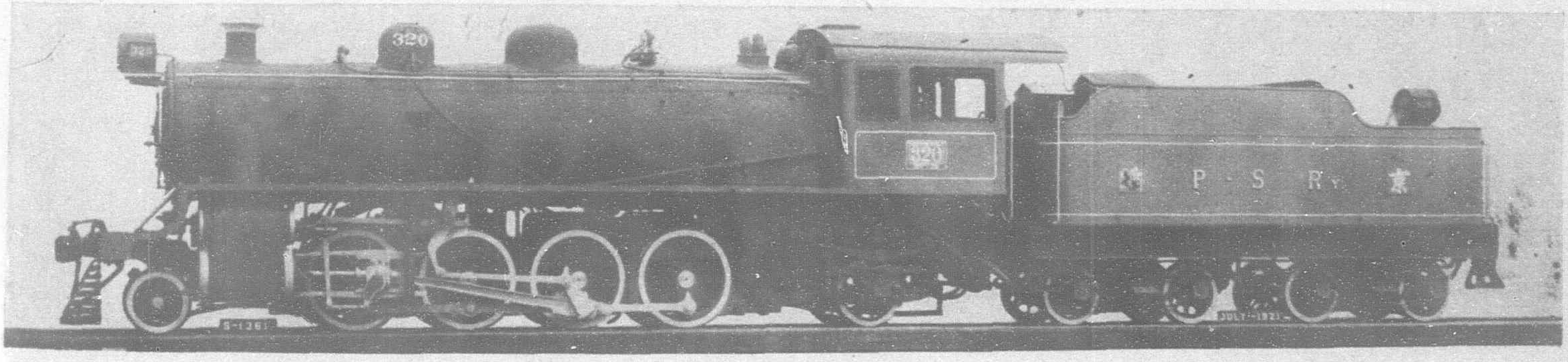


Fig. 5.—Mikado Type

1916 and 1922, Mikado types developing a maximum tractive power of 34,272 pounds were added in lots of 5, 5 and 36 and Pacific types developing a maximum tractive power of 25,664 pounds also in lots of 5, 2 and 13 respectively. Consolidation and Mikado types are used for passenger and freight service and the Pacific exclusively for fast passenger trains. All these modern engines were built by the American Locomotive Co., and are equipped with superheaters made by the Locomotive Superheater Co., of New York and American Westinghouse ET No. 6 air brakes working both on automatic and straight air systems. Most of these engines are equipped with the Franklin pneumatic firedoors and a few Mikados are equipped with feed water heaters supplied by the Feed Water Heater Co., of America, serving to show what saving can be affected by this economy appliance. Figures 3, 4 and 5 show respectively the type of Consolidations, Pacifics and Mikados, further particulars of which are shown in table 5.

Another thing worthy of mention is that most of the freight wagons and all the passenger cars are equipped with the British Westinghouse combined automatic and straight air braking systems and those having not as yet installed are being considered. This installation is essential for safety in railway operation and is required by state laws in many foreign countries. In China, however, although the passenger cars are so equipped, the freight wagons are not. Among Chinese railways, Peking-Suiyuan line may be safely said to possess the most modern motive power equipment. There are 138 engines on this line among which 75, representing the most modern designs of mountain, passenger and freight engines, were built by the American Locomotive Company, New York.

TABLE 5.—PASSENGER AND FREIGHT LOCOMOTIVES.

Item No.	No. of Engines	Type of Engines.	Builders of Engines	Maximum Tractive Power	Weight in Work Order	Year of Adoption	Particulars	
1	6	Consolidation 2-8-2	American Loco. Company	31,820-lbs.	183,500-lbs.	1912	Superheated steam.	Air brakes.
2	46	Mikado—4-6-2	„	34,272	188,500	5-1914 5-1916 36-1922	„ „	„ „
3	20	Pacific	„	25,664	184,500	5-1914 2-1916 13-1922	„ „	„ „

Restoration of the Works of the Nippon Electric Company, Ltd.

(Continued from page 27.)

were narrowed or temporarily eliminated and piece parts were stored in the lumber drying kilns to provide the space required.

Thirty-four days after the quake the manufacturing branch began delivering fully repaired apparatus which had been completely assembled before the quake but injured in the wreck and three weeks later resumed regular work on No. 92 jacks, making a delivery on November 5. Other jobs were resumed in rapid succession; deliveries of No. 12 protectors being made on November 13, extension sets on November 16, and keys on November 28.

By the end of the fifteenth week all departments which had been in the wrecked buildings had resumed regular production work in temporary locations and repairing of buildings was well under way.

The concrete buildings were demolished to the level of the second floor and proper repairs made to the remainder. Trusses of light poles were erected on the second floor and covered with galvanized iron, the result being one story buildings with a garret available for the storage of certain classes of materials. None of the second floor is available for anything other than storage.

While wrecking and repairs were being carried on, the space which would be available was reallotted, a new block plan layout was made of the entire manufacturing branch and detailed layouts of all departments were made in accordance with this plan. As repairs to the buildings progressed, the departments were reinstalled according to the new layouts. This work was completed and the entire manufacturing branch was running at full capacity by June 1, 1924.

In spite of their handicap, the Nippon Electric Company secured the orders for the greater part of the telephone equipment purchased or contracted for by the department of communications and the department of railways since the disaster and to the end of June, 1924. Of the orders secured, 79 per cent., consisted of equipment not manufactured by the Nippon Electric Company but which will be supplied by its affiliated companies, 18 per cent. consisted of equipment to be manufactured and 3 per cent. was supplied from merchandise stock.

Plans for the future include the demolition of all buildings now on the compound and the erection of eleven steel frame buildings, each three stories high. These buildings will provide a total gross floor area of 370,000 square feet. By roofing over the first floor in the light courts the percentage of first floor area will be increased sufficiently to permit of the installation of nearly all machine equipment on the ground floor, reducing the loads above the ground floor and thus decreasing the danger of damage from earthquakes. On the sides and rear of the compound the public streets are narrow and here the buildings will be located far enough from the property lines to provide amply wide safety zones in case of fires near by. The plans also include the installation of a complete sprinkler system.

Detailed drawings and specifications for the first new building are completed and work will be started during August of this year.

British Contracts for the Far East

From Our London Correspondent

Railway Wagons for India

A SECOND contract has been secured by Messrs. Camel, Laird & Co., Ltd., to build at their works at Nottingham, 775 four-wheeled all steel open goods wagons, for the East India railway company. Delivery of these is to be made at the rate of 5o wagons per week.

Railway Material for China

An order has been placed by the Jardine Engineering Corporation Ltd., with the Patent Shaft and Axletree Co., Ltd., Wednesbury, for bridge material required by the Shanghai-Hangchow-Ningpo railway. The same firm has also recently placed orders with the Metropolitan Carriage, Wagon & Finance Co., for 26-68-ft. coach underframes and 23 all steel covered wagons required by the Shanghai-Nanking railway.

Tanks for India

Messrs. Vickers Ltd., are making a number of improved tanks for India, and one of them, which has just been tested on the hilly roads in the Brightside district of Sheffield, has attracted a great deal of interest. The improvement on the older models include the installation of an Armstrong-Siddeley 90 h.p. engine, air-cooled by means of fans. The tank accommodates a gun crew of four and a driver, and has a gun mounted in the turret. The motive unit is on the caterpillar principle. The machine can develop a speed of 20 miles an hour, and answers its steering apparatus with remarkable ease. It is stated that it will mount an incline of 45 degrees.

New Vessel for British India Steam Navigation

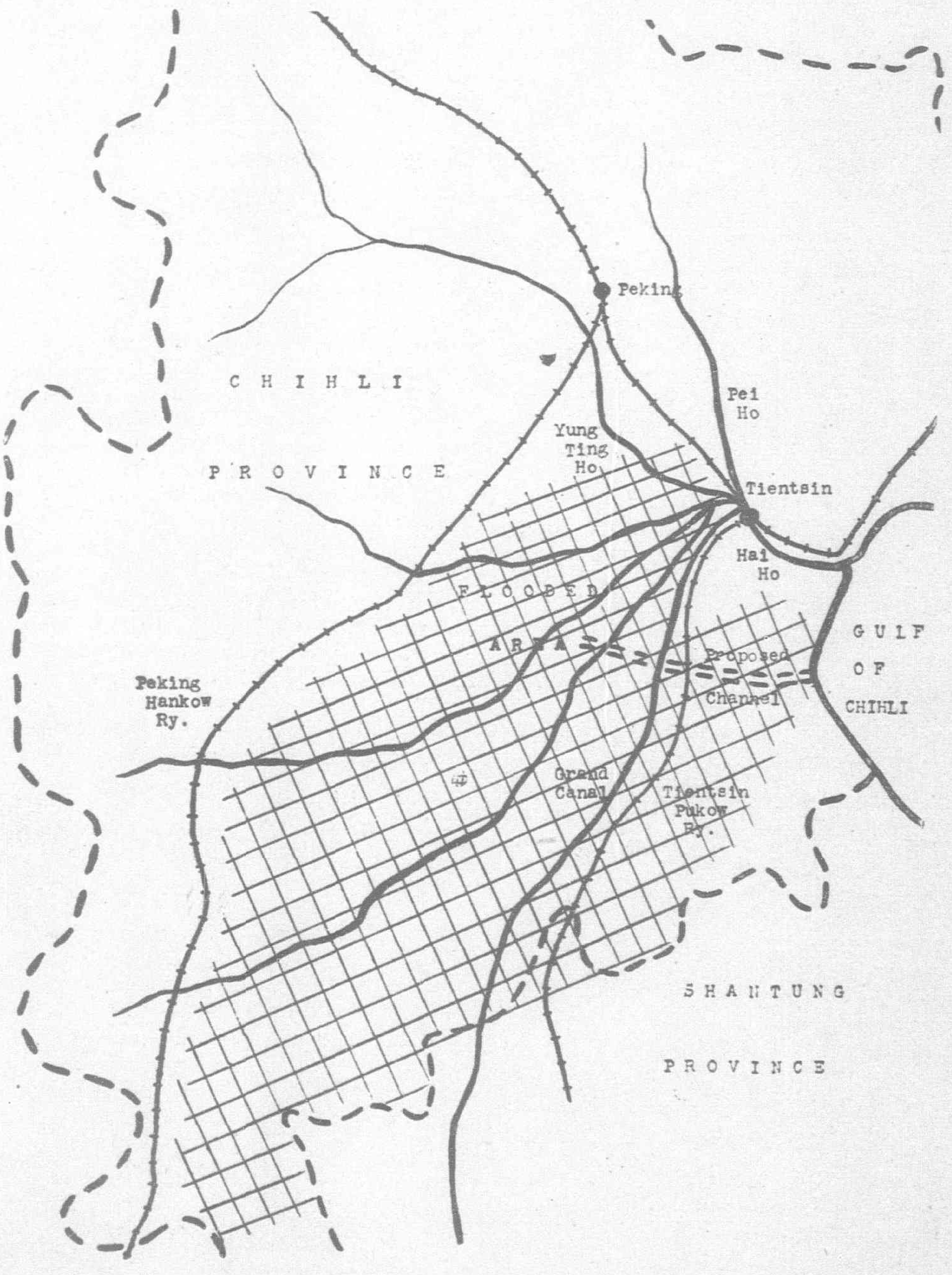
Messrs William Gray & Company, Ltd., have just secured a repeat order, to be built at their works at West Hartlepool, for a new vessel for the British India Steam Navigation Company. The vessel is to be of 7,830 gross tons register, with a deadweight carrying capacity of 12,000 tons.

A Big Engineering Project for Famine Relief

Drainage Channel to the Sea in Chihli Province

By Laurence Impey

THE recent civil war which has occurred in northern and central China has gone far towards diverting public attention from the dire catastrophe threatening as a result of the widespread and disastrous floods of last June, July and August, although in point of fact this same civil war has only greatly aggravated the pitiable conditions of destitution which are to be seen in the afflicated provinces. For not only has the internecine struggle absorbed the bulk of those governmental funds which it was hoped would be available for relief work, but it has also largely augmented the number of destitutes by reason of the military seizure of the few remaining stocks of fodder and transport animals. Add to this the fact that the defeated troops have scattered far and wide over northern and central China, to pick up a living as best they may, probably by banditry, and it can easily be realized that the problem of famine relief during the coming winter months is going to be one of the most serious that has confronted the Chinese during the past decade. So absolutely chaotic are the conditions on all the railways that ordinary traffic has been suspended for more than two months, while for the same period there has been no government worthy of the name functioning in Peking, so that there is no Chinese organization which can handle the question of relief work which is now so necessary. The only body standing ready to cope with the emergency is the China international famine relief commission, and even this institution finds itself almost insuperably handicapped by present conditions. For during a confused and widespread war such as this last has proved, it was practically impossible to send out parties in the field to carry out the necessary investigations as to the needs of the various districts affected, with the result that the situation which is best known is that one which is in the immediate vicinity of Peking itself, the reports from the outlying provinces not being fully completed even yet at the beginning of December. Then too, the financial difficulties of the commission have been increased very largely, not only because of the drain on the country's own resources, but also because foreign nations have been discouraged from rendering assistance by the sight of one faction in China busily engaged in cutting the throats of another, while a third and far larger group is on the verge of starvation. But in this attitude, natural though it may be, the writer is of the opinion that the outside world is at fault, for it seems hardly just that millions of innocent people should be thus condemned to suffering through the insatiable ambition of a few militaristic *tuchuns*, who care nothing as to the miseries of the flood victims, merely regarding them as so much cannon fodder. The commission, therefore, has made its appeal to the representatives of the foreign powers in Peking, requesting that a grant of a special customs surtax be approved, notwithstanding the chaos caused by the war, in order that some funds might be forthcoming to enable them to meet the famine conditions which are bound to ensue during the coming winter months. It appears that with the exception of the French, all the governments concerned are agreeable to the proposal, and the only reason which the writer can suggest as to why the latter have not yet given their consent is that they are using their veto as a weapon to force the Chinese to agree to a settlement of the "Gold Franc Case." As to the rights and wrongs of this there are many opinions, and this is no place to discuss them, but it does not seem as if a liberal and fair-minded nation such as the French have always proved themselves to



be should allow a financial situation such as the "Gold Franc Question" to affect their decision on a matter with which it has in reality no connection whatever. Therefore, if and when some satisfactory settlement of this difficulty is arrived at, it is estimated that some eight million dollars will become available for relief work, and it is on the basis of this hope that the international famine relief commission have outlined their program for the coming winter and spring months.

As is well known, the general policy of the commission in the past has been to provide relief by giving employment to the heads of families which are destitute and using the labor thus available on projects which will be of permanent value to the communities and areas which have been affected. With this standpoint in mind the executive committee of the C.I.F.R.C. have selected the province of Chihli as being the one which was most gravely affected by the floods, and a study of the needs and possibilities of this huge area was undertaken early in the autumn. Not less than ten thousand square miles of arable land were found to be under water, of which over six thousand square miles are still inundated at the beginning of December, so that it was obvious that a gigantic problem was placed before the engineering staff of the commission when a drainage scheme for this area was called for, both in order to employ the flood victims and also to provide a permanent solution of a danger which threatened to inundate this region and the neighboring city of Tientsin every three or four years.

The sunken area known as the Wen An Wa, stretching between the Peking-Hankow and the Tientsin-Pukow railways, is practically on sea level, and its only protection from flood has been its numerous dyke systems, particularly that one known as the "Thousand Mile Dyke" lying to the north. When these dykes succumbed to the abnormally high waters of last July and August, the whole of this region was covered to a depth of ten or twelve feet by the floods, and it seems improbable that this will ever drain off unless an outlet channel is provided to the sea. A glance at the accompanying sketch map will show what a large proportion of the arable plain of northern China is affected by the flood and how vital it is that a scheme shall be put through which will deal with the menace once and for all, for the drainage of the present river systems all tends towards Tientsin, where the channel of the Hai Ho has time and again proved its insufficiency to cope with additional flood waters. The engineers of the C.I.F.R.C. have, therefore, considered this pressing problem from all its angles, and have now put forward a scheme for the construction of a drainage canal some forty-five miles long and five hundred feet wide, to run from the Wen An Wa region across the Machang canal, the Grand canal, the Tientsin-Pukow railway and down to the sea at a point some fifty miles south of Taku. By this means it is estimated that the whole low lying south-west of Tientsin can be drained, and a large proportion of the flood water diverted from the Hai Ho during the rainy season, thus securing the regularity of its channel and the the safety of Tientsin itself. The cost of the work will be somewhere in the neighborhood of six million dollars, and it will afford employment to more than one hundred and fifty thousand workers when in full swing, so that if it is reckoned that each laborer supports a family of four or five there will be famine relief afforded to nearly one million persons on this one scheme alone.

Even this will be under the probable necessities of the province, for from the reports to hand of sixty counties it appears that nearly a million and a half people are or will be destitute owing to the floods. When the word "destitute" is used in connection with famine relief it would be well for the reader to remember what is meant by the term in China, where a peasant or coolie household ordinarily lives on less than one hundred dollars a year, "destitution" therefore indicating a state of things where the victim has neither clothes, food or firing in view for the future, and merely exists on the outskirts of some town by selling the children and feeding on the garbage dumps, until the bitter cold of a Chinese winter night completes the tragedy. These are the people whom it is hoped to save this winter if the scheme can be carried out and the channel dug, but in order that this may be done it is first necessary to secure the funds, a matter which hinges on the pressure exerted by public opinion on those in authority. It should be remembered in connection with this request for the granting of the customs surtax that it is not proposed to sink the whole of the six million dollars permanently in the province of Chihli, for as the funds thus to be raised are derived from the whole of China it is obviously only fair that China as a whole should ultimately benefit by their expenditure. It is proposed, therefore, to use this money on a loan basis first in one province and then in another, as the need may arise, and it is worth noting in this connection that the C.I.F.R.C. has already expended some hundreds of thousands of dollars in this manner in previous years, the loan always being repaid on time by the afflicted region to which it was granted.

In stressing this one particular area in Chihli as needing help it must not be supposed that the claims of others have been altogether overlooked; it is simply that the C.I.F.R.C. feel the necessity of putting through one project in full, and they have therefore gone into the matter in some detail, but at the same time engineers and investigators have visited affected regions in the provinces of Hunan, Kiangsi, Honan, etc., and schemes of relief are in course of preparation, which will be put into operation supposing that the necessary funds are forthcoming and that the ever recurrent curse of civil war does not absolutely prohibit relief workers from entering the fields indicated. Here again it is felt that the pressure of public opinion can do more than anything else to help the efforts of the commission, for the indirect influence exerted by well organized publicity in China and abroad can scarcely be overestimated.

New Motor Ships for the O.S.K.

(Continued from page 30.)

pipe, from which branches are taken to each of the separate valves. Speed control of the engine is effected by variation of the lift of the fuel valves, the arrangement being actuated from a lever at the control station, although individual valves may be cut out independently of each other if necessary.

New Engine Features

The engine is arranged in two groups of three cylinders, each group of cylinders being supported on an entablature which is bolted to the cast-iron frame. The two entablatures are connected together at the centre by means of a suitable cast-iron distance piece. Instead of having mechanically-operated starting air valves in each cylinder, a non-return valve is fitted, the compressed air being distributed to the various cylinders at the correct timing by means of distributing valves operated from the camshaft and arranged below it. Thus there are only three mechanically operated valves in each cylinder cover, namely, for inlet, exhaust and the admission of fuel. An unusual point is that the exhaust valves are water-cooled, the cooling water being supplied to and discharged from the valves by means of flexible piping.

When the engine is in the stop position the fuel-valve lever rollers are out of contact with their cams. If it is desired to reverse, the reversing lever is moved, bringing a servo motor into operation which turns the manœuvring shaft on which the levers for the exhaust and inlet valves are pivoted. Thus the rollers at the ends of these levers are lifted from the cams, and the camshaft is then moved fore and aft under the influence of the servo motor, the valve levers being finally brought down on to the exhaust cams. The starting air lever is then operated, which admits air to the cylinders in a position to receive it, and finally in fuel lever is actuated, which brings the fuel-valve rollers in contact with the cams.

The engine is self-contained, the circulating, lubricating oil, bilge and sanitary pumps all being driven at the back of the propelling motor. These are of the plunger type and operate at about 60 r.p.m.

South America Liners

Orders have recently been placed by the same owners for three large cargo and passenger ships of particular interest. All of these vessels will be built in Japan at the Mitsubishi Dockyard, and will be of 430-ft. b.p. They will carry about 6,800 tons of cargo, and will be provided with a large amount of passenger accommodation. In each ship there will be installed two Sulzer-type engines developing a total of 4,500 b.h.p. or about 6,000 i.h.p. and running at 110 r.p.m. Electricity will be employed throughout the vessel, and the generating plant will comprise three 250 b.h.p. oil engines running at 300 r.p.m. and driving 150-k.w. generators in addition to an auxiliary of 47.5 k.w.

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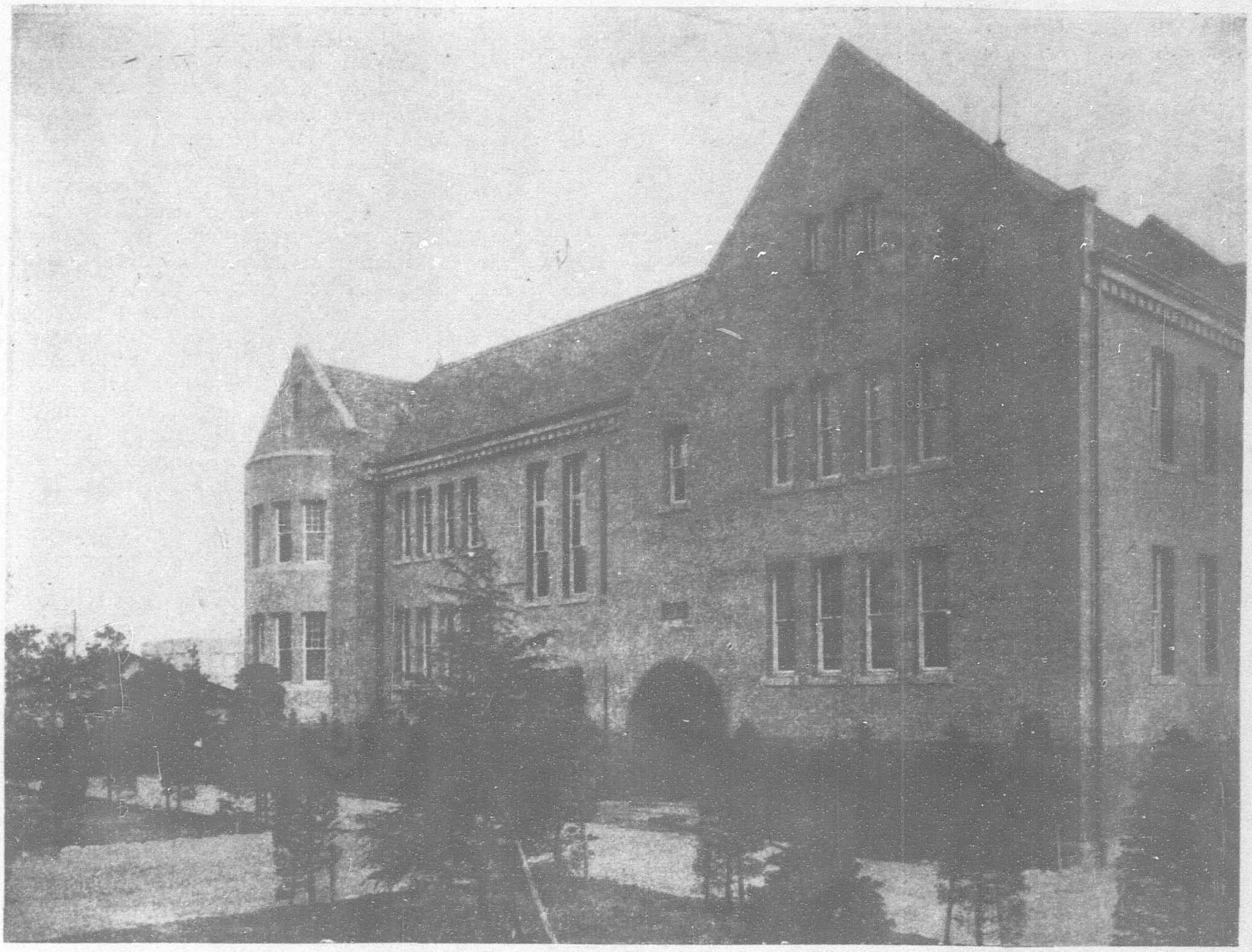


Front View of the Oriental Library in Tokyo, in which is incorporated the "G. E. Morrison Library." Erected and Endowed by Baron Iwasaki at a total cost of Yen 1,500,000

New Home of the Morrison Library

ALL book-lovers and students of Far Eastern affairs will be gratified to learn that after many adventures the celebrated Morrison library is at last safely housed in a modern fire-proof building in Tokyo, thanks to the beneficence of Baron Iwasaki, head of the great Mitsubishi interests of Japan. It is a sad commentary on Chinese public spirit that the name and fame of the man who devoted his life to advancing the higher interests of their country should be perpetuated by a monument erected in another land. The treasure-house of the rarest documents in the world dealing with the Far East and especially with China representing twenty years work on the part of the late Dr. G. W. Morrison, is now located in the Honjo ward of the capital of Japan, forming part of what is known as the Toyo Bunko or the Oriental library.

The Morrison library consists of some 35,000 volumes, mostly treating with the Orient, to which have been added many valuable works collected under the supervision of Dr. Shiratori at a total expense to Baron Iwasaki of Yen 1,500,000, including the cost for the present building.

The first edition of the travels of Marco Polo, published in 1592, one of the first books ever printed, is in the collection. A testament published in Amakusa at the beginning of the Tokugawa era and many important works covering all ages of Japanese history, which were treasured by the Iwasaki, also are included in the Oriental library.

The collection was begun in 1897 when Dr. Morrison first went to China as a correspondent of *The Times.* At first, he kept his books in his private residence in the legation quarter in Peking, but later preserved them in the library of his residence at Wangfuching Road, known as Morrison street.

The Late Dr. G. E. Morrison

But even before coming to China, Dr. Morrison had begun to buy books, when documents dealing with the celestial empire were drug on the market. After reaching China he systematically purchased every available book on China in every language. The collection includes works on China, Tibet, Mongolia, Manchuria, Kashgaria, Siberia, Korea, Formosa and a comprehensive set of works on central Asia.

There are books in 20 languages, including English, French, German, Norwegian, Swedish, Danish, Italian, Latin, Spanish, Portuguese, Turkish, Arabic, and Hebrew. Dictionaries alone number more than 400, including the early vocabulary of Mentzel, published in 1685, giving a Latin translation of the characters of the Nestorian alphabet; the MS. dictionary completed in 1724 by Fernandez Serrano, the MS. dictionary used by Sir John Barrow, who was attached to Lord Macartney's Embassy in China in 1793 and a complete list of Turkish books on

Islamism, presented to Dr. Morrison by the late Mr. W. W. Rockhill, American ambassador to Turkey.

The library also contains such a work as Oliver Goldsmith's "Citizen of the World," in its rare first edition of 1762; first edition of De Foe's second voyage of Robinson Crusoe, in which he came to Peking and passed through the Gobi desert and Siberia, printed in 1719.

The library is more complete than any other in works on the missionary history of China. It is believed to contain a complete set in French, Italian and Latin of all the controversial pamphlets written at the time of the famous dispute between the Jesuits and Dominicans regarding the ancestral worship in China in the early part of the eighteenth century.

The Boxer rebellion is represented fully, more than 100 works dealing with the siege of Peking being found on the shelves. At that time the library was narrowly saved from destruction. A chain of several hundred Chinese Christians bore the library from the legation building to Prince Su's palace and a few hours later the library building was destroyed by fire, as were nearly all other libraries in Peking. There are hundreds of maps as well in the collection. All of the books are in foreign languages.

Dr. Morrison determined to sell his elaborate library in 1916 and naturally wished it to remain in Peking but as there was no response to his invitation from the Chinese, he reluctantly invited offers from other quarters. Several handsome offers were received from American universities and the American minister, Dr. Paul S. Reinsch, but they were still far under the valuation which Dr. Morrison placed on his collection. Mr. M. Odagiri, head of the Japanese group in the consortium and one of the managing-directors of the Yokohama Specia Bank in charge of its China branches, familiar with the value of the collection through long residence in Peking and contact with its owner, interested his chief, Mr. J. Inouye, then governor of the Yokohama Specie Bank in purchasing it for Japan. After having the collection appraised by Dr. M. Uyeda, dean of literature in the Tokyo imperial university, they successfully persuaded Baron Iwasaki to acquire it for the sum of £35,000.

The books were delivered to Mr. Odagiri in August 1917 and shipped to Japan where they lay for some time in a storage godown attached to a villa belonging to Baron Iwasaki in the Fukagawa ward of Tokyo. A cloudburst followed by a flood which covered this district, damaged many of the priceless volumes in their packing cases, but after calling in experts and sparing no expense, they were all cleaned and rebound and except for a few duplicates and ordinary volumes, the library was completely restored.

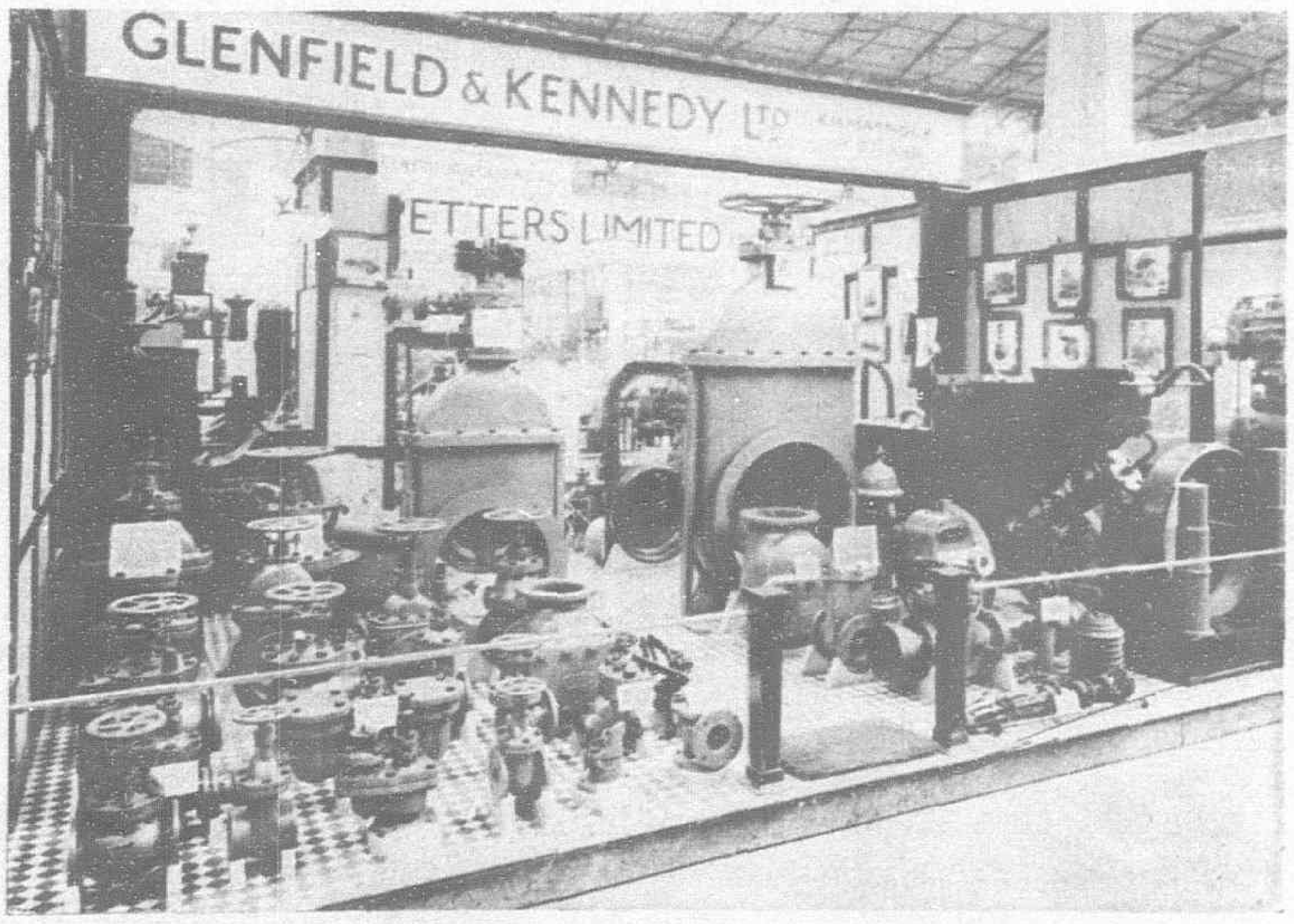
The library then found a temporary home in one of the Mitsubishi buildings in the business heart of Tokyo and in the great quake and fire which destroyed many other valuable libraries, the Morrison collection escaped without the slightest damage. In transferring his collection to Baron Iwasaki, Dr. Morrison made three conditions; first, that the collection should be preserved intact under the name of the "G. W. Morrison Library": second, he placed no objection to its being incorporated in a larger library having the same scope and purpose and third, that the collection be open to the public and students. In conformity with the desires and will of Dr. Morrison, Baron Iwasaki has purchased many old and new books for the purpose of expanding and completing the original collection, at the same time starting work on the construction of a suitable fireproof edifice to accommodate the treasures and provide rooms for study and research. This building, located at Kami-Fujimae-cho, Komagome, in the Homjo ward of Tokyo was completed in November of last year when Baron Iwasaki handed over the building site, library building, library, furnishings, fixtures and a maintenance endowment to a board of trustees to conduct it for the cause of learning. This board is headed by Mr. J. Inouye, former governor of the bank of Japan and finance minister, Mr. M. Odagiri, managing-director of the Yokohama Specie Bank, Dr. M. Uyeda, Dr. K. Shiratori and Mr. S. Kirishima.

In enlarging the scope of the library, Baron Iwasaki has wisely added a complete Chinese and Japanese section of which some 20,000 volumes are in Chinese and several thousand in Japanese, making it a most valuable aid to students of Far Eastern affairs. The trustees have made special arrangements to facilitate the use of the library by equipping several rooms for the use of those conducting a serious study and calling for the use of many reference books at one time.

Valves for Irrigation Works

FEW parts of the world are more active in developing irrigation projects at this time than the Far East. From Japan and Korea to Java many large and important plans being carried into execution for extending the area of rice lands through irrigation schemes. Several of these, located in Korea, will call for the expenditure of at least Y.100,000,000 while the governments of Indo-China, Siam, Philippines and the Netherlands East Indies are carrying out similar important projects. Of particular interest to irrigation and river control engineers is the exhibit of Messrs. Glenfield and Kennedy, Ltd. of Kilmarnock, Scotland, at the British empire exhibition where amongst their wide range of water engineering specialties are shown models of some of their larger sluice gate installations in Africa and Asia. This firm, well known for its work in India, Siam, China, and the Straits Settlements, have their own offices and technical staffs both at Calcutta and Bombay. In connection with steel sluice gate installations for irrigation work they not only supply the extensive equipment complete from their works at Kilmarnock, but, as in the case of Badlapur barrage scheme at Bombay, erect it themselves on the site.

At present they have in hand the very large sluice gate contract for the Sarda canal scheme in India on the Nepal-United provinces frontier and are exhibiting at Wembley, models of the Vaal River barrage scheme at Vereeniging for which they supplied 36 steel sluice gates, involving over 2,000 tons of steel. Their most recent contract in the irrigation field was for the Siamese government works at Nakon-Nayok.



The Exhibit of Glenfield & Kennedy, Ltd., at Wembley

Particularly interesting is the exhibit of the electrically operated "Glenfield" sluice valve, as used for the control of water supply, merely by operating a small switch any distance away, the current passing through the usual connecting wires. These valves are a very fine piece of work, being the result of many years' experience in this special section of valve engineering, with a particularly heat arrangement of the motor on the top of the valves, together with the necessary driving gear to operate the valve spindle. The electric motors used are of the same high grade quality as the valves, being of the totally enclosed, reversible type, working either A.C. or D.C. and are much more efficient than the ordinary slip ring type commonly used for this purpose.

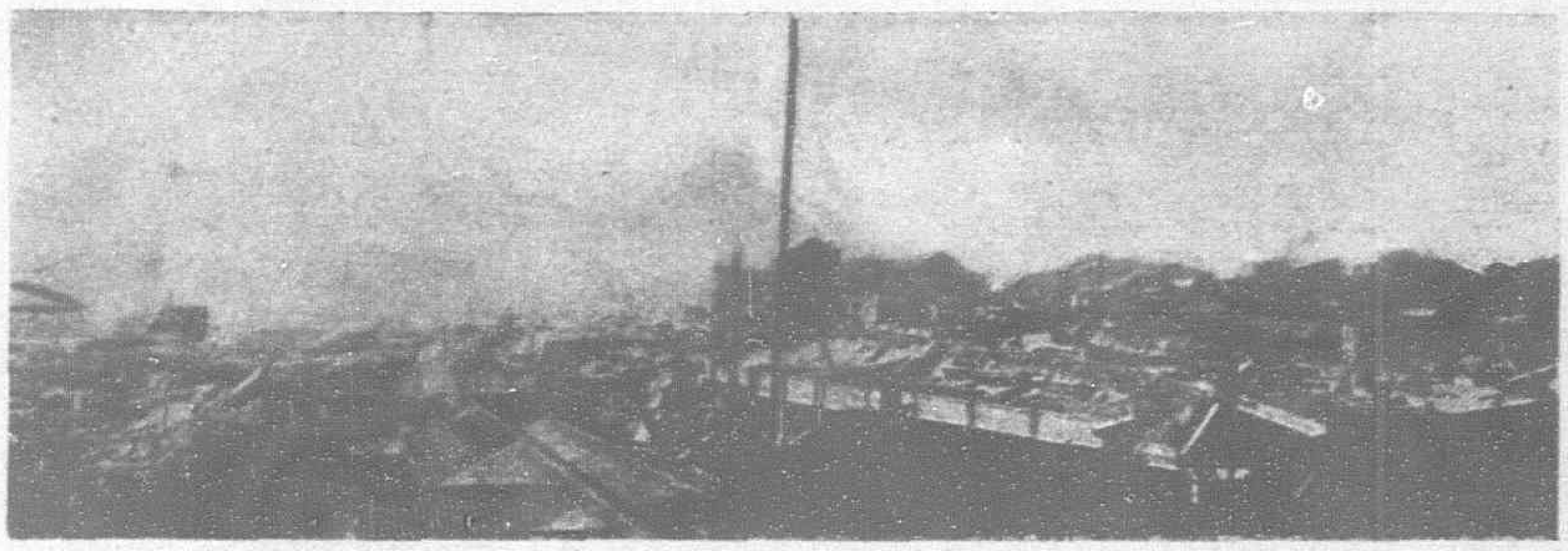
The largest valve on the stand is a 36″ hand operated exhaust steam and water circulating sluice valve. Messrs. Glenfield and Kennedy, however, supply valves up to 144″ diameter, weighing over 20 tons each; typical of which in the Far East are those supplied to the "Tata" hydro-electric scheme, Bombay. Other items shown are the "Peebles" automatic sand washing machine, specimens of centrifugal castings, hygienic drinking fountains, and apparatus for the mechanical cleaning of the inside of water pipes, consisting essentially of an arrangement of knives and scrapers attached in the front of a piston which fits the pipe and is forced through from one hatchbox to another by the water pressure cutting out the calcerous and other deposits.

Restoration of the Works of the Nippon Electric Company, Ltd.

By A. G. Jillard, General Manufacturing Advisor, Nippon Electric Company

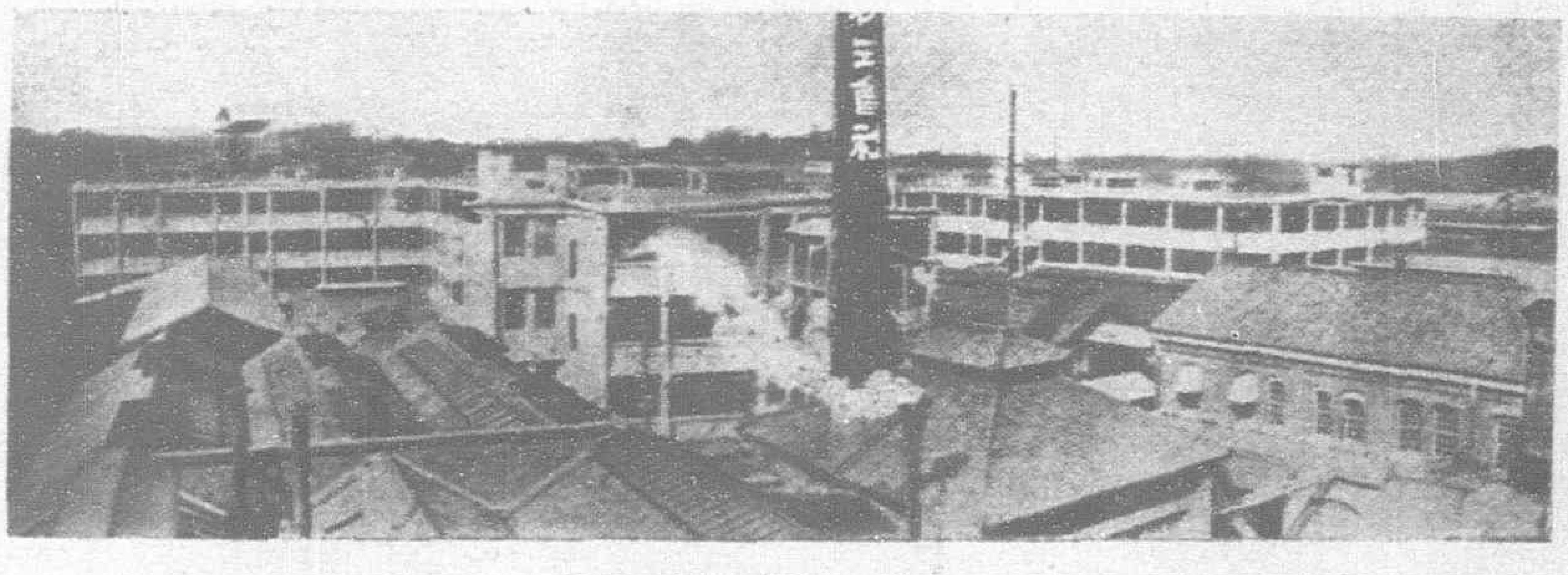
WHEN the devastating earthquake occurred on September 1st of last year the plant of the Nippon Electric Company, Ltd., included 293,750 square feet of floor area ; approximately 185,750 square feet of this being in five modern, reinforced concrete buildings. Four of these buildings were three stories high while the fifth was partly two stories and partly three stories. The remainder of the buildings were of brick construction, one, two and three stories high.

The earthquake resulted in very serious damage to the concrete buildings, consisting in general of a failure of the columns of the second and third floors ; the roofs and third floors dropping to the second floors. In some places the second floor failed and dropped to the ground floor and part of the side wall of the first floor of the two story building was badly shattered. The brick buildings suffered considerable damage in the way of cracked and broken walls but they did not fall and their occupants and contents were unharmed.



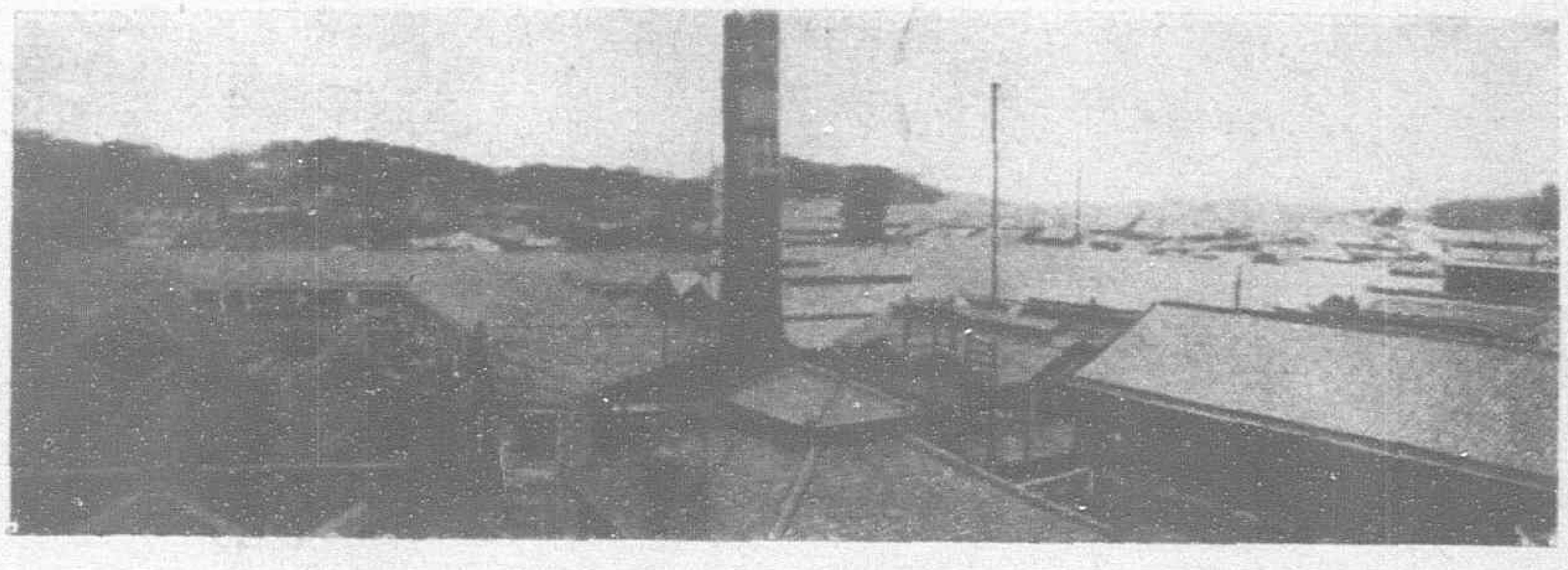
The concrete buildings as they looked before the quake

The concrete buildings were occupied almost entirely by the manufacturing branch and they represented about 73 per cent. of the area of that branch.



Just after the quake

How badly the manufacturing branch was crippled and the magnitude of the task of rehabilitation involved may be realized from the fact that, punch press, milling, drilling, screw machine and lathe, metal finishing, wood working, meter, receiver and transmitter assembly, switchboard assembly, general assembly, and tool-making departments, with their associated inspection groups and store rooms were all in the wrecked buildings, as were the engineering and drafting departments and the manufacturing department office.



As the buildings look to-day

Fortunately the plant was not reached by the fires which swept over about 60 per cent. of the city and the losses, though high, were not nearly so great as they might have been. The principal items of property loss were :

Buildings	Y. 790,685
Machinery, permanent fixtures, etc.	385,557
Material, parts and merchandise	244,582
Merchandise awaiting acceptance destroyed by fire at government compounds	251,519

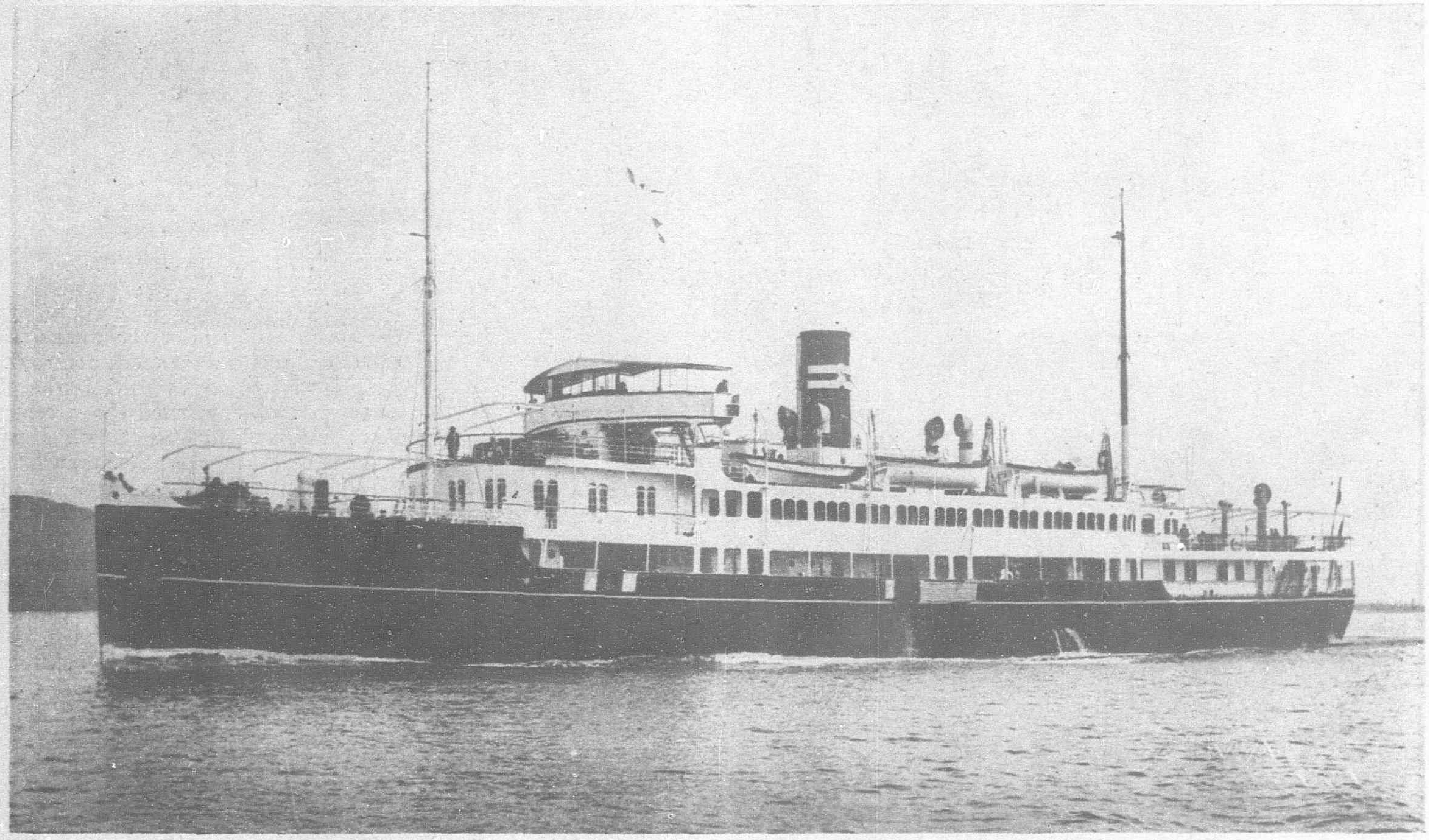
The demolition of the wrecked portions of the buildings and the salvaging of materials, parts, apparatus and machines were started simultaneously on the seventh day after the quake, the wrecking work being done by an outside contractor and the salvaging by company employees.

Machines, benches, stock racks, etc., supported the wreckage to a certain extent and formed many pockets access to which was gained by cutting holes in the floors and into which men crawled on hands and knees, passing parts and apparatus from hand to hand to improvised chutes to the ground. From the chutes the recovered parts and apparatus were transported to temporary sheds or to the less damaged buildings where other employees were at work sorting, cleaning, dismantling and repacking. At the same time accessible machines, many of which had to be partly dismantled to clear them of the wreckage, were lowered through holes cut in the floors and were taken to the other buildings where they were completely dismantled and cleaned. Undamaged machines were then reassembled while the damaged ones were classified according to the extent of the repairs required and partly reassembled or stored in their dismantled state as the circumstances warranted. As the wreckage afforded but little protection from the many heavy rains which occurred with unusual frequency for weeks after the quake, it was necessary to remove nearly all machines and stock from the ground floor of the wrecked buildings.

All wrecking was completed in three months and during that period the contractor furnished 24,581 man days of labor. For a part of the time four hundred and fifty men were employed on wrecking work. 3,536 labor days with horse wagons and 116 labor days with motor trucks were spent in removing the *débris.*

Had the problem been merely to salvage and repairs what could be recovered from the wrecked buildings it would have been amply difficult, but as the salvage was being crowded into the other buildings, it was at the same time necessary to prepare for the resumption of manufacturing, and unit by unit as they were required, emergency installations of metal finishing equipment, tool-making equipment, automatic and hand screw machines, wood-working machines, punch presses, milling machines, drill presses, etc., were set up wherever space could be provided. Machines in the brick buildings which could be spared temporarily were taken down and stored in close formation, aisles

(Continued on page 22).



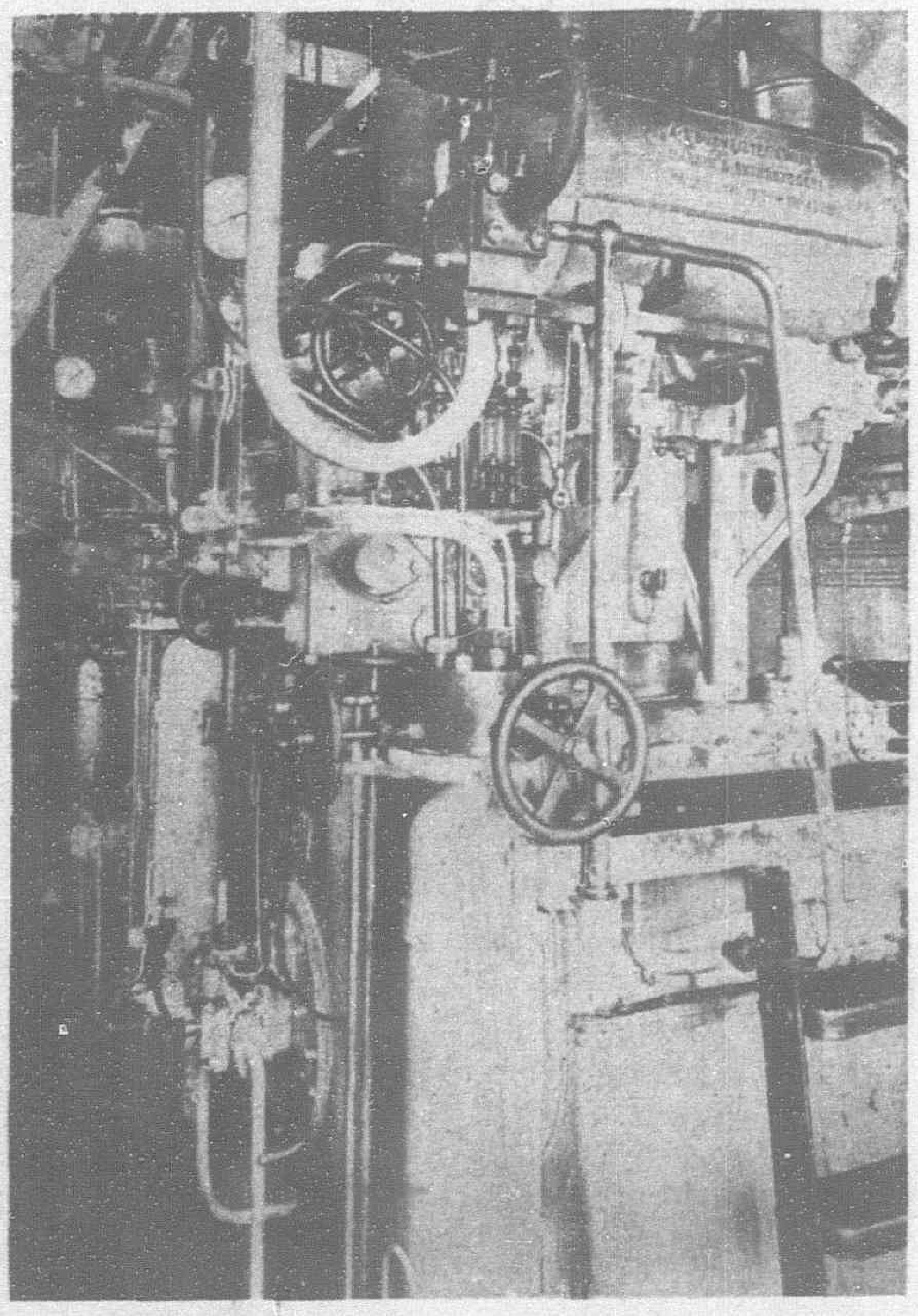
A FLOATING PALACE ON THE INLAND SEA

The New 1,550-Ton Twin-Screw Diesel Motor Passenger Ship *Kurenai Maru* built by Osaka Iron Works, Ltd. for the Kobe-Beppu Service of the Osaka Shosen Kaisha

New Motor Ships for the O.S.K.

Palatial Motor Ship for the Inland Sea

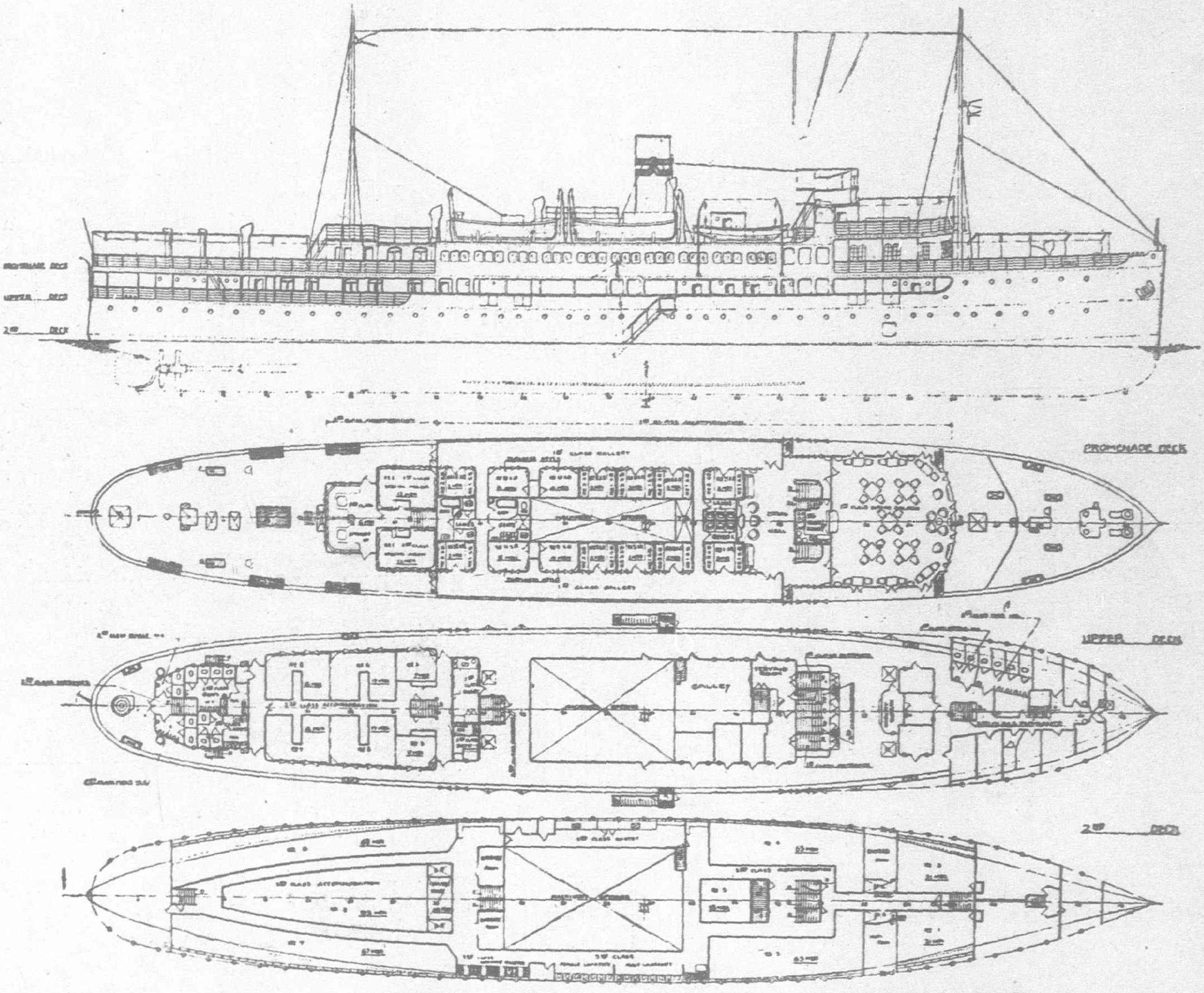
THE first of three new motorships for the Japanese coastwise trade was recently placed in commission by the Osaka Shosen Kaisha when the *Kurenai Maru* made her maiden trip on the Kobe-Beppu run. This service, one of the most popular in Japan, carries thousands of tourists and health seekers from Central Japan to the celebrated springs of Beppu on the north-east coast of the island of Kyushu. For many years the O. S. K. has maintained the finest of its coastal steamships on this scenic run through the Inland Sea, and made every effort to cater to the comforts of the traveling public by providing luxurious accommodations and the best of service. The *Kurenai Maru* has become so firmly established in the minds of the Japanese public with the Kobe-Beppu run, that in building a new and up-to-date steamer, the name of the old favorite was transferred to the new vessel, the old *Kurenai* being renamed the *Naruto Maru* and placed on another service.



Three Burmeister & Wain Auxiliary Diesel Engines operating Generating Sets on the *Kurenai Maru*

The new *Kurenai Maru* has been built purely for the passenger traffic and although smaller, compares avorably with the well-known luxurious N. Y. K. Shanghai express steamers in point of accommodation and general design. The vessel is a twin-screw Diesel motorship of 1,550 tons built at the Sakurajima yard of the Osaka Iron Works, one of the most successful shipbuilding enterprises of Japan. Her length overall is 251-ft., breadth, 38-ft., depth moulded, 19-ft., 6-in. with a mean draft of 11-ft. 6-in. Although capable of making over 15 knots an hour with a fuel oil consumption of 6⅓ tons per 24 hours, her service speed will be restricted to 13¾ knots on a fixed schedule of 18 hours from Kobe to Beppu, or two hours less than the railway express service.

The vessel is engined with two 6 cylinder main Diesel engines totalling 2,100 h.p. and three 1 cylinder auxiliaries totalling 150 b.h.p. These engines were made by Burmeister & Wain, Ltd. at their Copenhagen works and shipped to Japan for installation. The propellors are driven directly from the main engines, while the auxiliary engines, each driving 33 k.w. generators are used for manœuvring, lighting, etc. The cooling water, forced-lubrication, fuel oil, bilge and sanitary pumps, etc., are all motor driven. Various air reservoirs and silencers complete the Diesel machinery of the vessel. Steering is



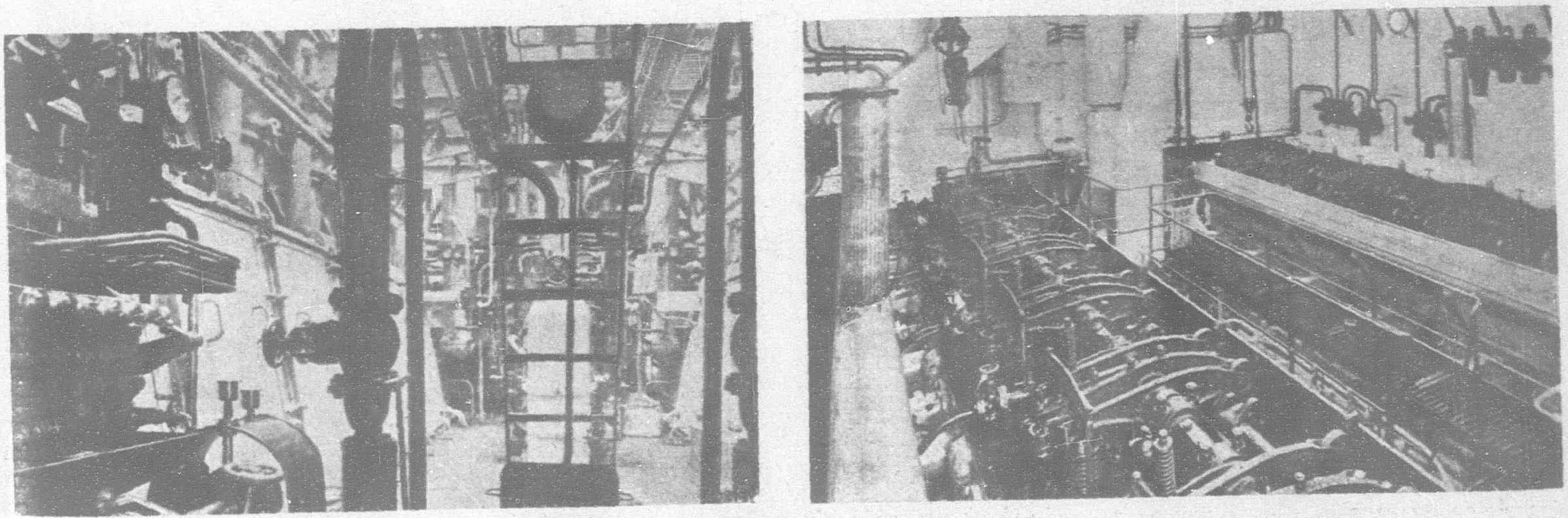
DECK PLANS AND PROFILE OF THE DIESEL MOTORSHIP *KURENAI MARU*

done by an electro-hydraulic steering engine with telemotor. The anchors are handled by an electric capstan of 30 tons hoisting power manufactured by Thomas B. Thrige of Copenhagen which is practically soundless in operation.

The vessel underwent its official trials on September 11 last and was found satisfactory in every detail and placed on the run between Kobe and Beppu on September 23.

Passenger Accommodation

The first-class cabins are entered from the glass-sheltered decks, and consist of 10 in European style and 4 in Japanese. The former are fitted with two broad, built-in bunks which can be used as sofas in the day time (there are no upper berths) and are richly upholstered. In the centre is a washstand with large mirror, and shelves above.



DIESEL MOTORSHIP *KURENAI MARU*

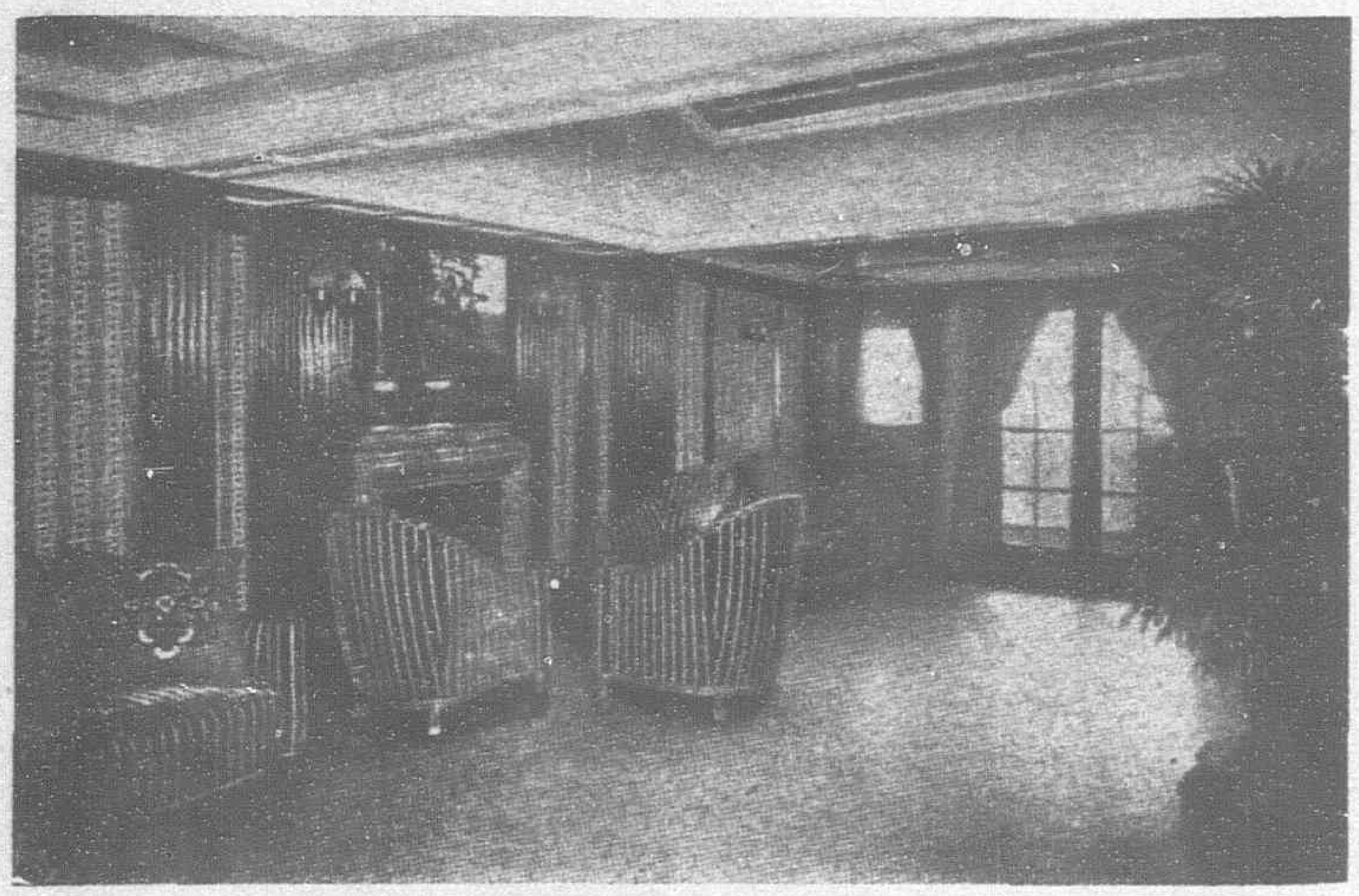
View Between Main Engines

View Across Top of Engine Room

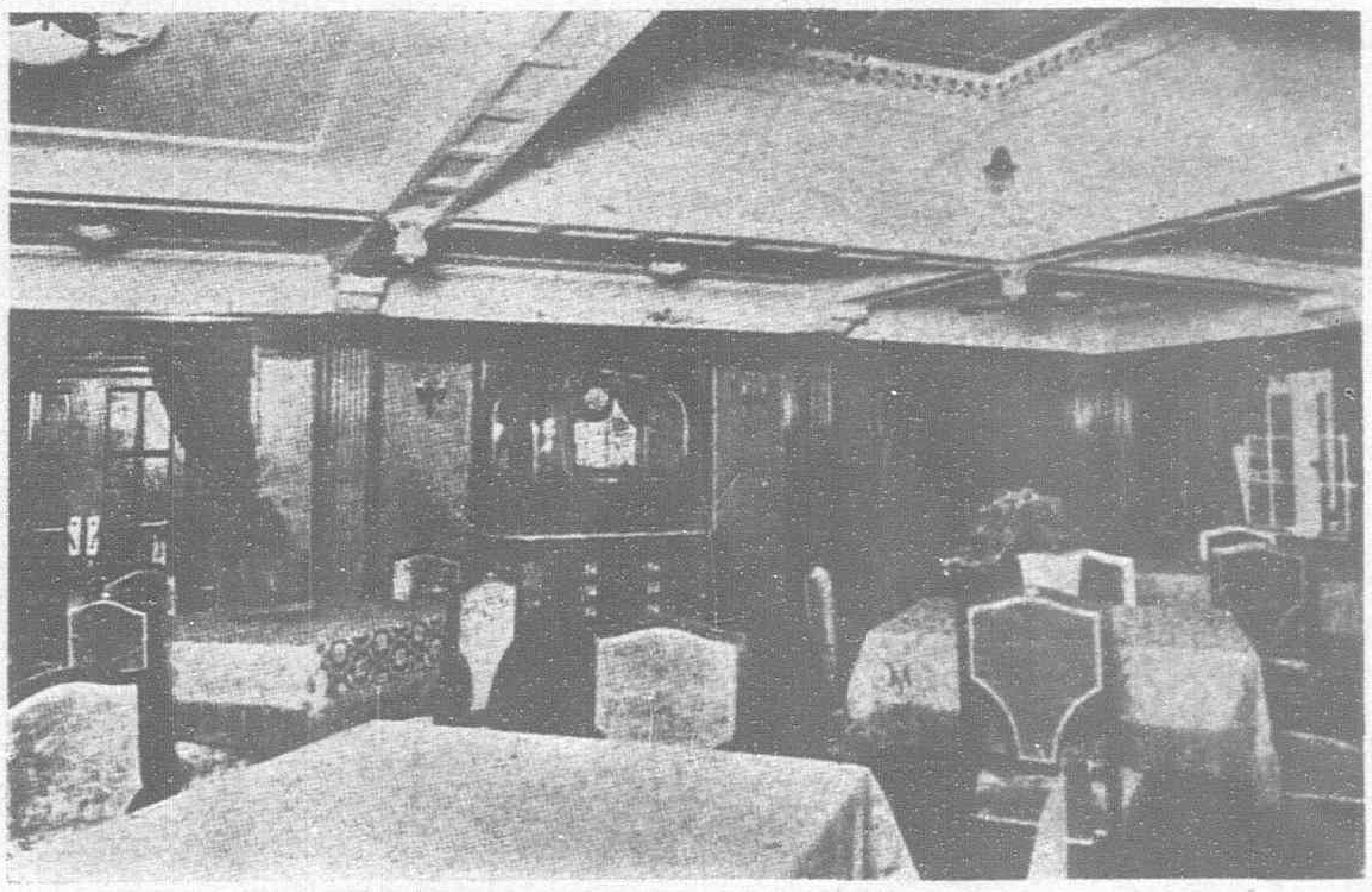
and a steam radiator below. There is always running water. A small reading light and electric fan add to the comfort. The Japanese cabins are a replica of rooms in a well-built Japanese home, every detail being well worked out in miniature, including sliding doors and windows and mats. The fore deck is used as a promenade for first-class passengers.

The second-class is arranged in Japanese style, with mats, and has two large *cabins-de-luxe* for families or special parties. A smoking-room in European style, panelled in oak, is for the exclusive use of second-class. Third-class is also quite in Japanese style, but with benches and tables for smoking and social use. The large afterdeck is for the use of these classes.

The lavatories and bathrooms throughout are in white tile, and most modern with hot and cold running water. Flush closets are in both foreign and Japanese styles. Baths are supplied with fresh and salt running water.

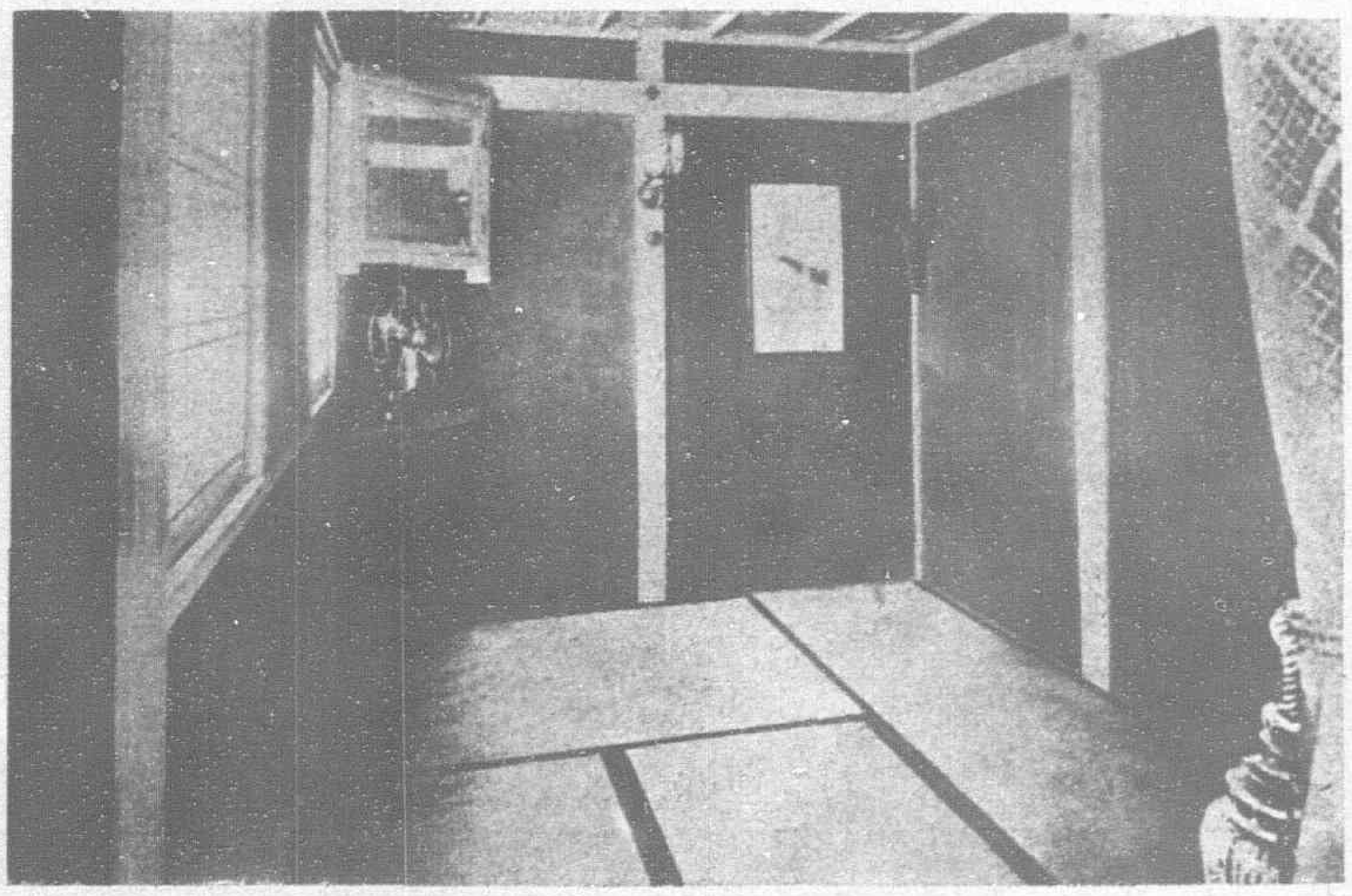


Entrance and Social Hall



Dining Saloon

Glassed-in Corridor



Japanese Style Cabin

Main Hall and Dining Saloon

Taking advantage of the absence of dirt and smell the owners have been lavish in the arrangement and decoration of the passenger accommodation, and have achieved a success artistically as well as from the side of comfort. First-class is reached by two main stairways from the main deck, being situated on the upper deck and separated from the other classes. These stairways enter on to a main hall, which is also used for a social hall and for a smoking room. It is in Viennese style, panelled in figured linen, with overhead lights and also electric sconces. A fireplace in Italian marble, with an oil-painting of a Kyoto scene in autumn above it, makes a central point around which are grouped armchairs and sofas upholstered in velvet moquette. The dining saloon gives off this hall, entered on either side by bevelled glass doors. This is in the French Renaissance style, panelled in oak and maple, and windows in place of portholes, parquetted floor, and electric wall sconces. Tables are for two or four persons and the saloon seats 32 persons generaously. Ceiling fans here and in the hall make it cool in summer, and steam radiators cleverly arranged take care of the winter.

Other O.S.K. Motor Ships

In addition to the *Kurenai Maru,* the O.S.K. is building two other small passenger and cargo coasting motorships.

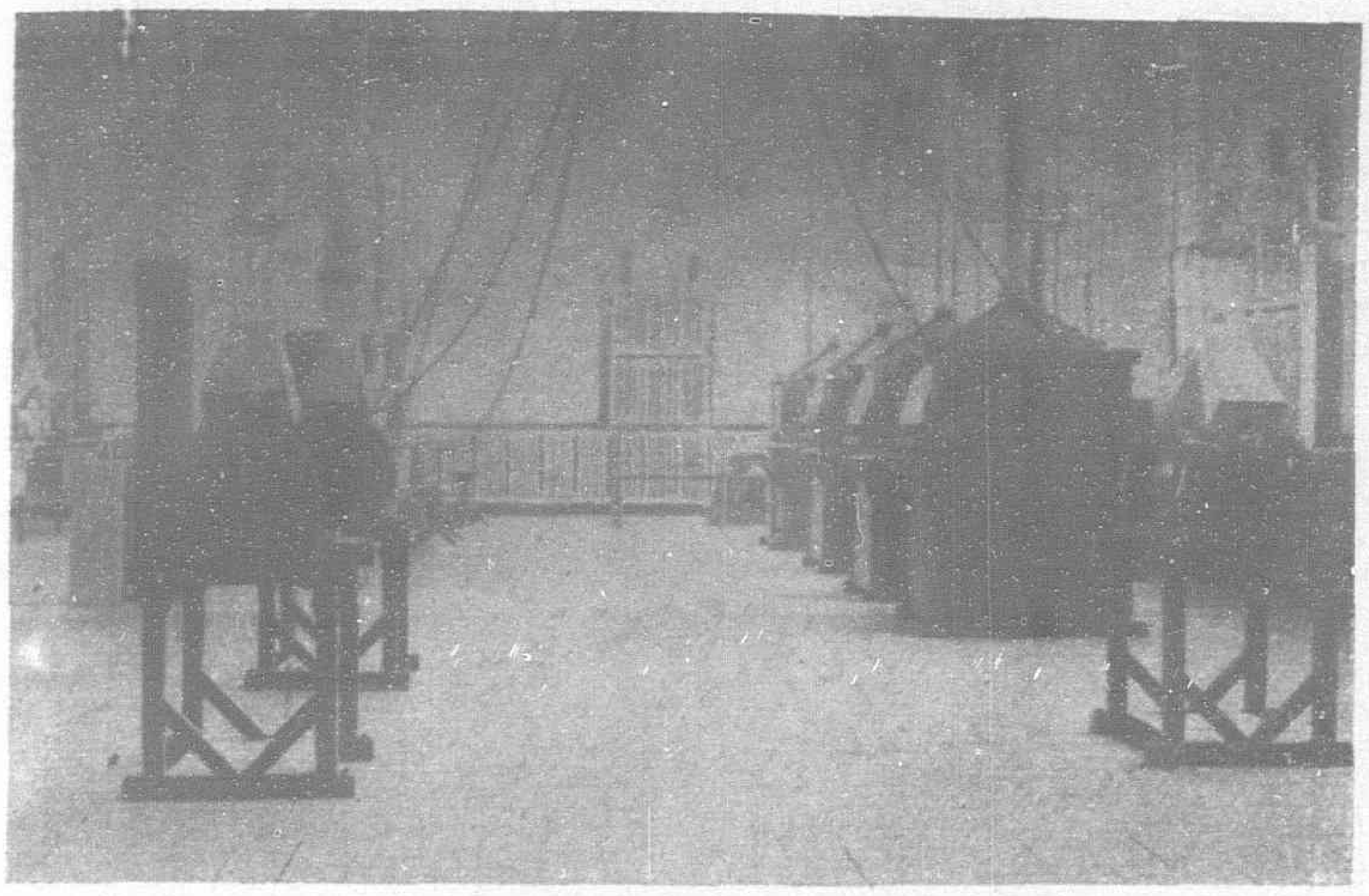
The new coasters are about 170-ft. long and have a beam of 28-ft. with a depth of 18-ft. 3-in. They are designed to carry some 300 or 400 passengers, in second and third-class accommodation, the cabins being of the large open type, as is customary for traffic of this class in the Far East.

On the promenade deck are the captain's and deck officers' quarters, while on the upper deck is arranged the second-class accommodation, forward and aft of the engine room. On the deck below are the saloons for the third-class passengers, with the crew's quarters forward, the engine room being amidships. Below the accommodation forward and aft are the two holds for cargo.

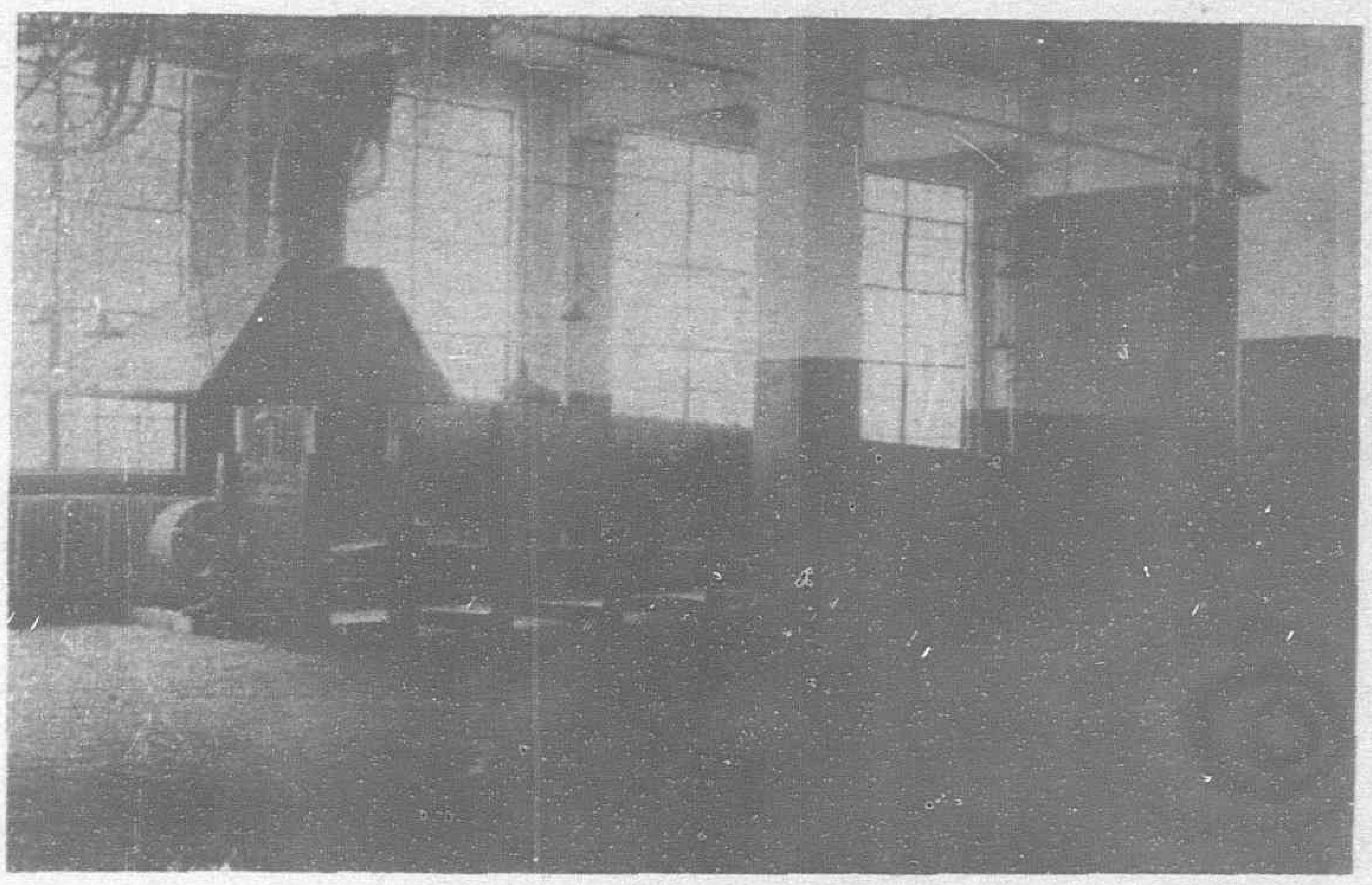
The order for the machinery for each of these vessels was placed with Vickers, and the two Diesel engines are now completing trials at the Barrow works.

A single engine is to be installed in each of these ships developing 600 to 650 b.h.p. at 150 to 160 r.p.m. It is a six-cylinder type, with cylinders 18$\frac{1}{4}$-in. diameter and a stroke of 27-in., and embodies the main features employed in the larger Vickers mercantile engines installed in many tank ships. The chief characteristic in this design is, of course, the employment of solid injection instead of the more usual atomisation by means of highly compressed air. Only one pump, operating at about 4,000-lb. per sq. inch, is used. This is driven from a layshaft operated through spur gearing from the crankshaft. The fuel is supplied to a common

(Continued on page 24).



Dusting and Stalk-cutting Machines

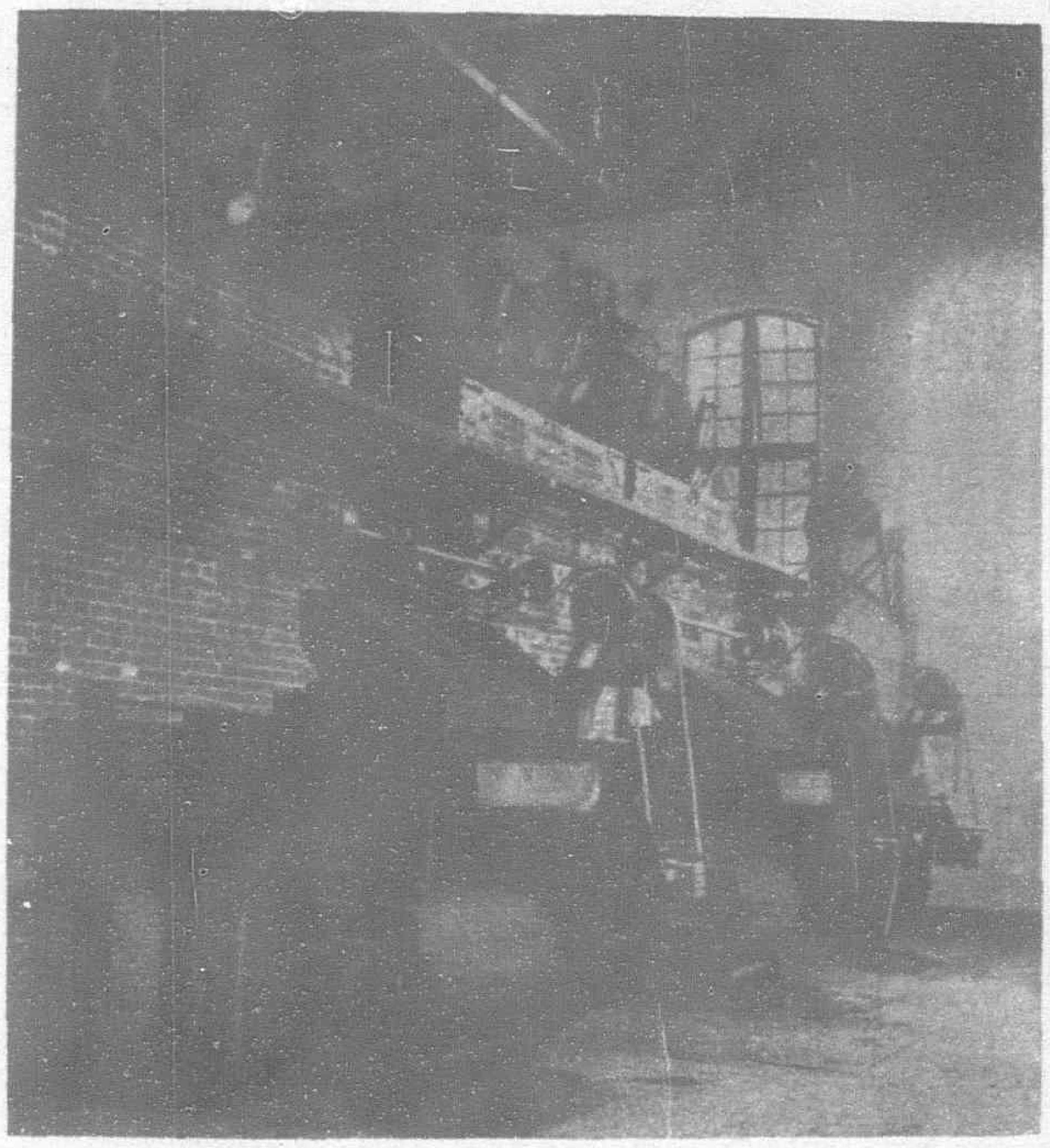


Damping Machine

The Tobacco Industry of Chosen

TOBACCO manufacture in Korea was started for the first time in 1903 by the Korean-Japanese Tobacco Company, and this led to other companies being established in various parts. At the time the monopoly was instituted, there were about thirty factories at work, those of the East Asia Tobacco Company and the Korean Tobacco Company being the largest. In 1913, after the British-American Trust quitted the field, the East Asia Tobacco Company bought up two of the smaller companies and thereafter supplied 80 per cent. of the whole demand of the country.

Since the application of the Japanese tobacco monopoly law to Chosen (Korea), the government has taken over a number of existing tobacco and allied companies. The factories of the Toa Tobacco Company, Ltd., the Tozai Shokai and the printing works of the Keijo Printing Company have been reorganized and improved although these organizations have not yet been brought up to a desired efficiency. In March, 1924, a new tobacco factory was completed at Taiku, costing Y.1,740,000. This factory is modern in every respect.



200 H.P. "Takuma" System Water Tube Boiler, in the Taikiu Tobacco Factory

The following factories are engaged in producing cigarettes and allied products :—

Head Office, printing only.

Jingido, Keijo Branch Office, cigarettes and cut tobacco.

Gishu-dori, cigarette with mouth-pieces.

Taihei-dori, rough cut-tobacco. Seidaimon

Zenshu Branch Office, cigarette with mouth-pieces.

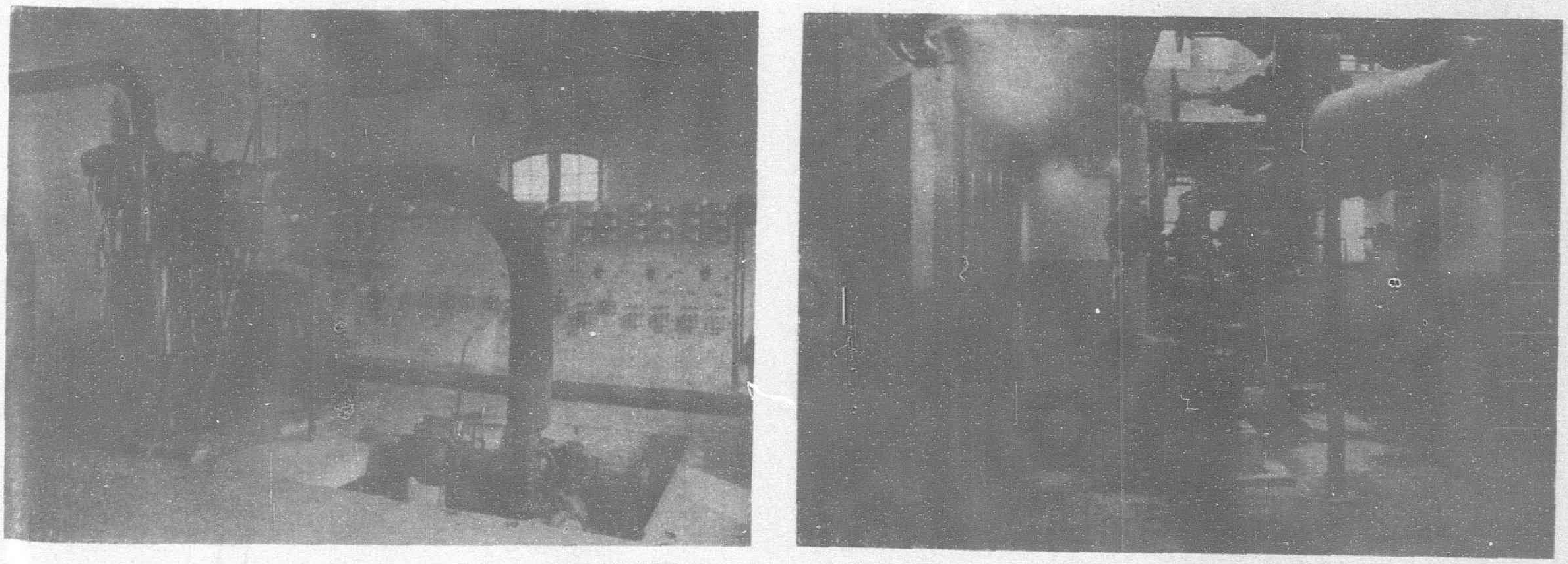
New factory, Taikiu Branch Office, cigarettes with and without mouth-pieces.

Branch factory, Shinonome-cho, rough cut-tobacco.

Heijo Branch Office, cigarette and rough cut-tobacco.

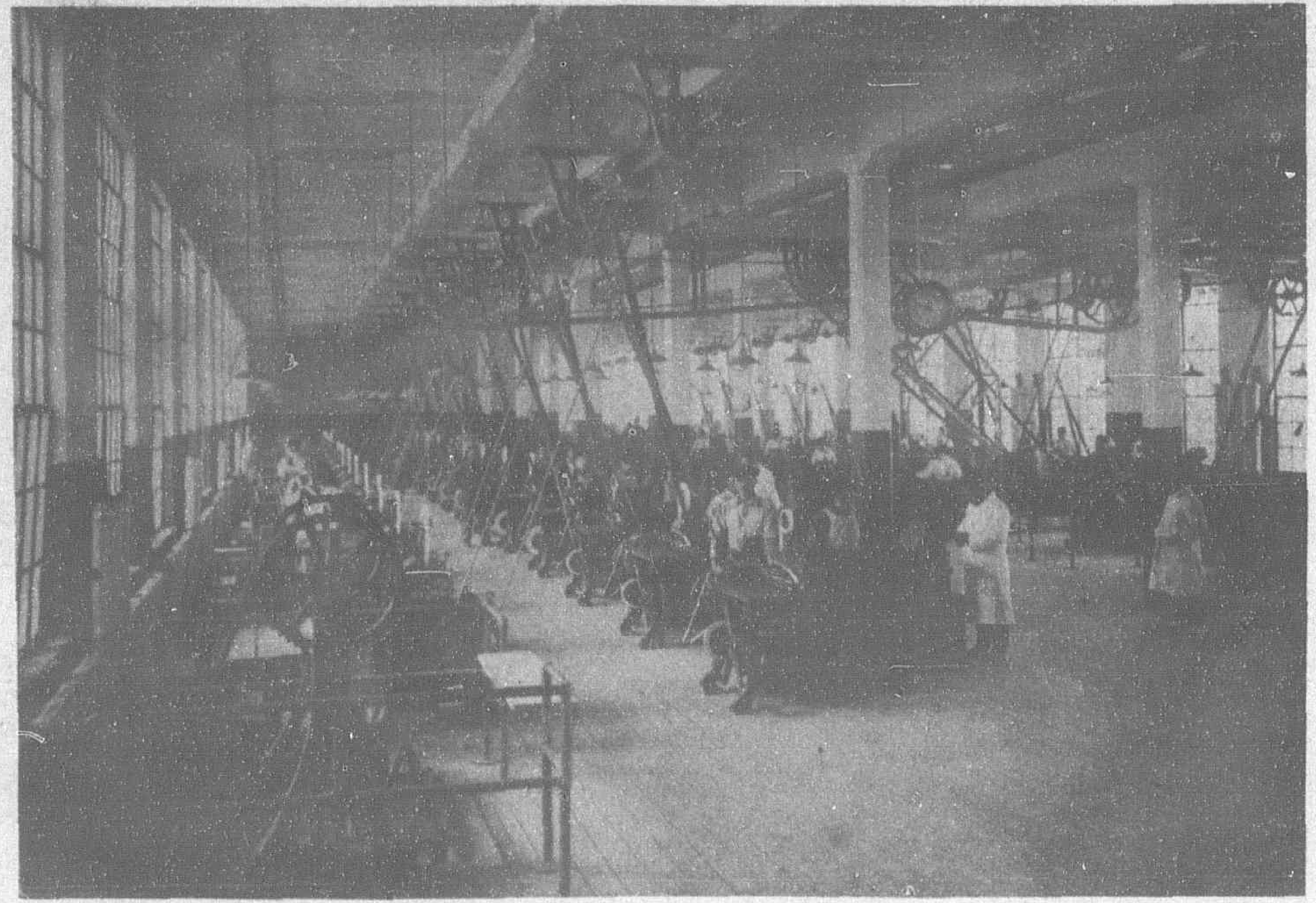
The brands manufactured are as follows:

Cigarette with mouth-pieces: "Shikishima," "Asahi" and "Matsukaze."



125 K.W. Generator and Condenser

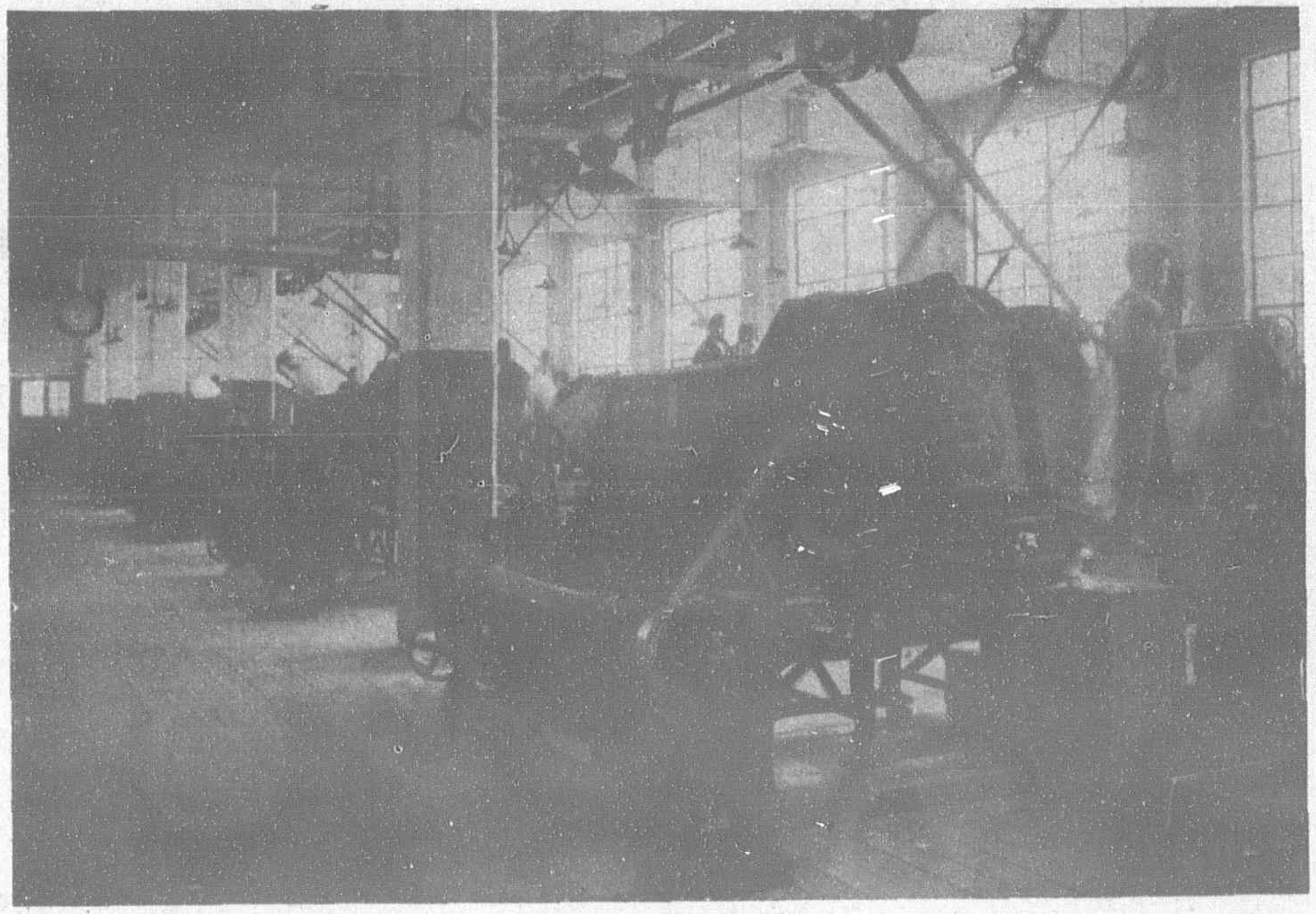
MODERN MACHINERY IN TAIKIU TOBACCO FACTORY



"Hirose" System Cigarette Machines

Cutting Machines

Sealing the Packages



Curling Machines

Cigarettes without mouth-pieces : " G. G. C." " Kaida," " Pigeon," " Mako " and " Maple."

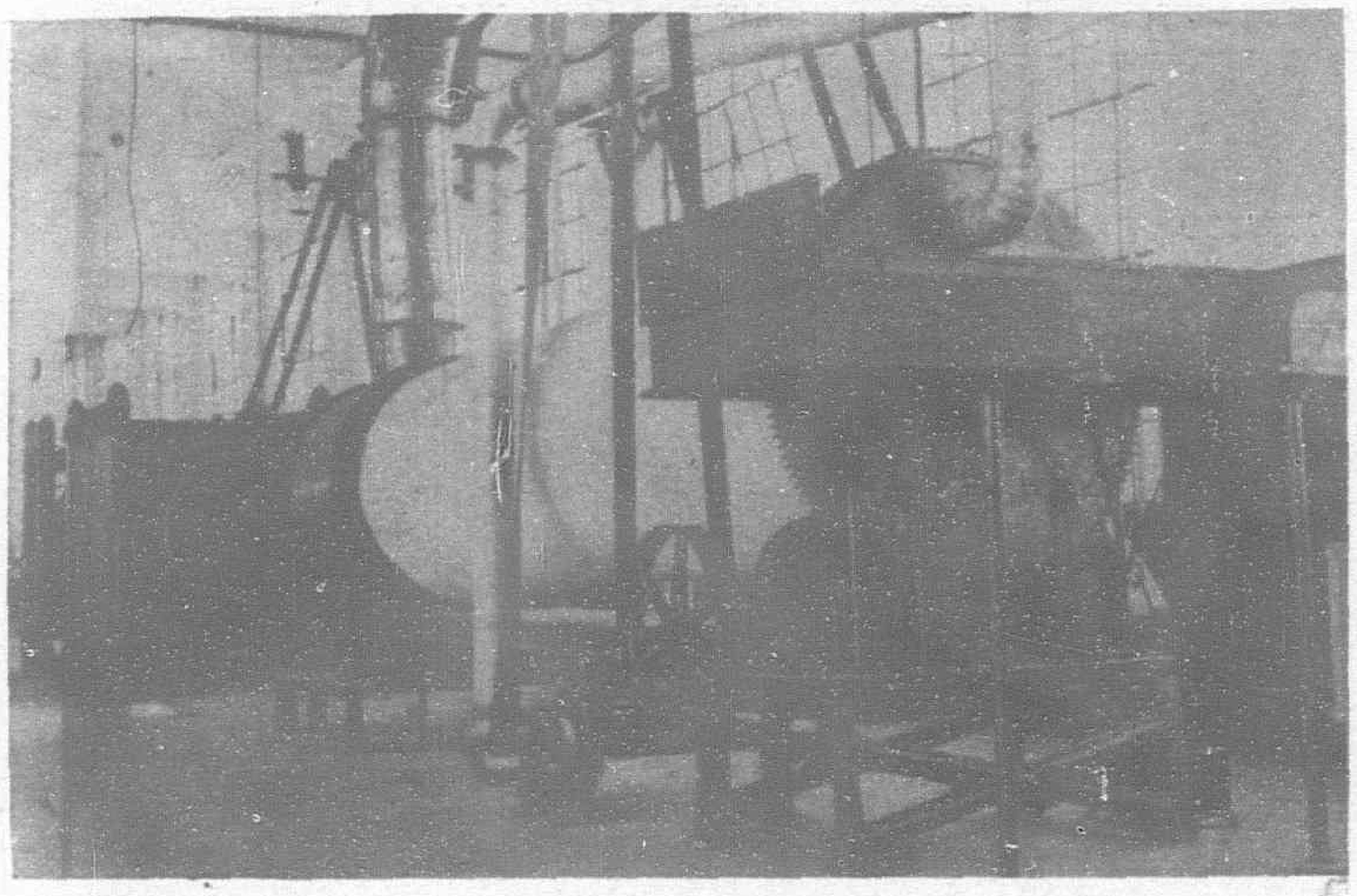
Cut-tobacco : "Satsuki " and " Ayame."

Rough cut-tobacco : " Choju-en " and "Kien."

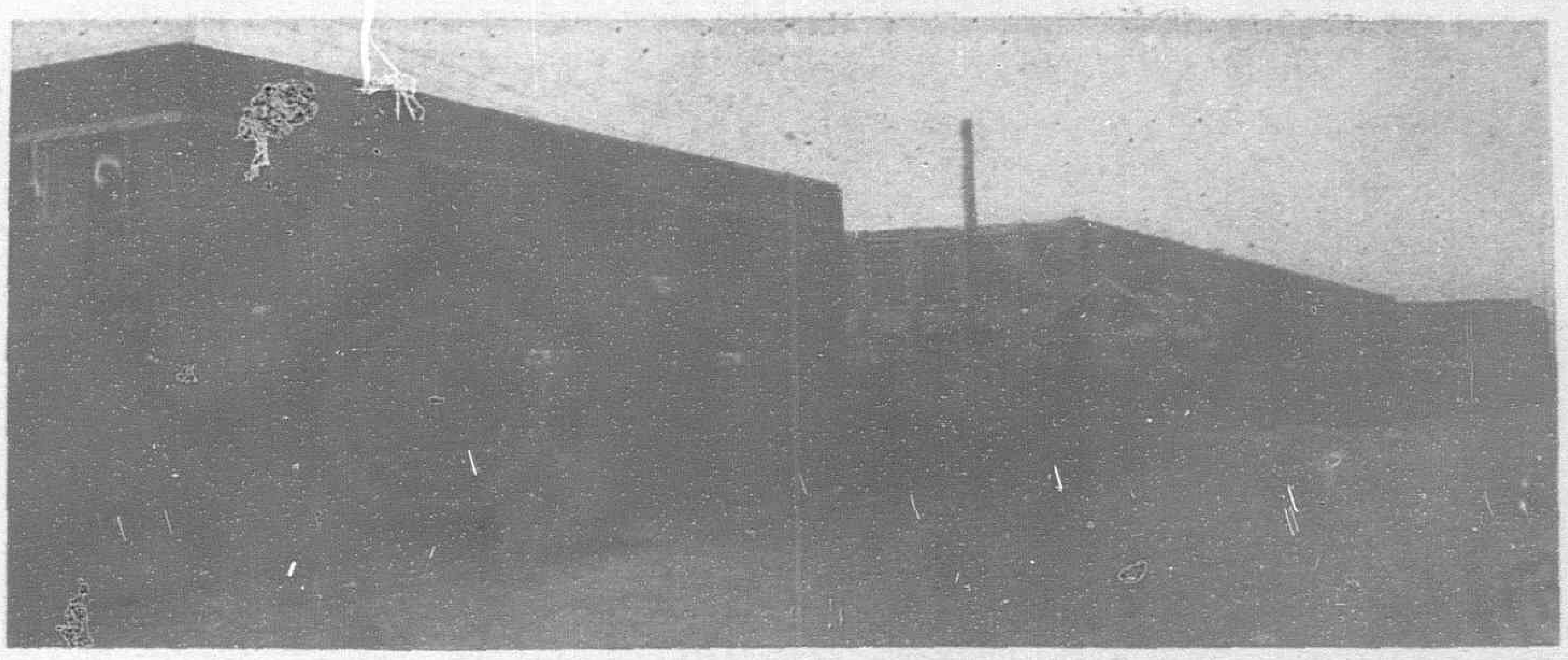
Rough cut tobacco was at one time manufactured outside the tobacco monopoly. The government found, however, that the non-monopolistic companies produced this commodity at a high price while the grade of goods was inferior. Since 1922, the monopoly has been producing this type of tobacco, which is exceedingly popular among the poorer classes of Koreans. At one time, cigarettes with mouth-pieces were more popular than any other forms. This type of cigarette is gradually losing in favor.

The following tables shows the consumption of various types of tobacco in Chosen :—

Year	*Cigarette with mouth-pieces*	*Cigarette without mouth-pieces*	*Cut-tobacco*	*Rough cut-tobacco.*
1921*	984,900,000	2,039,914,000	19,230 *kwan*‡	— *kwan*
1922 ..	1,645,540,000	2,370,414,000	23,226	93,918
1923 ..	1,069,960,000	2,894,639,000	30,708	676,463
1924†	1,170,000,000	3,650,562,000	25,200	975,000



Drying Machine



General View of the Taikiu Tobacco Factory operated by the Chosen Government Tobacco Monopoly

Tobacco leaf used in the production of cigarettes and rough-cut tobacco is Korean grown. Better brands of cigarettes with mouth-pieces, such as the Shikishima and Asahi brands, are made of Japan-grown leaf blended with the native products. For the best grades American tobacco leaf is used.

Tobacco cultivators' associations, co-operating with the Bank of Chosen, have been organized in various parts of the country with the purpose of improving the cultivation of tobacco and fostering the industry. The first of these associations was organized in 1913, since when twenty-five organizations, having a membership of 50,000 have come into existence. These associations co-operate with the tobacco monopoly.

The consumption of tobacco leaf is given in the following table :—

Year	Japan leaf	Foreign leaf	Chosen leaf	Totel
	kwan	*kwan*	*kwan*	*kwan*
1921	118,271	93,956	692,368	904,595
1922	184,281	196,595	873,256	1,254,132
1923	138,947	211,509	1,493,911	1,844,367

The production of tobacco products has increased steadily since the commencement of operations under the tobacco monopoly. The following tables give the total production and the value thereof :—

CIGARETTES WITH MOUTH-PIECES

Brands.	1921 (9 months) Quant.	1921 (9 months) Amount.	1922 Quant.	1922 Amount.	1923 Quant.	1923 Amount.	1924 (estimated) Quant.	1924 (estimated) Amount.
Shikishama	91,000	682,500	220,960	1,657,200	228,740	1,715,550	180,000	1,350,000
Asahi	453,200	2,719,200	819,100	4,914,600	470,640	2,823,840	540,000	3,240,000
Matsukaze	338,800	1,694,000	605,480	3,027,400	370,580	1,667,610	460,000	2,070,000
Shiratsuyu	101,900	407,600	—	—	—	—	—	—
Total	984,900	5,503,300	1,645,140	9,599,200	1,069,960	6,207,000	1,180,000	6,660,000

CIGARETTES WITHOUT MOUTH-PIECES

	1921 (9 months) Quant.	1921 (9 months) Amount.	1922 Quant.	1922 Amount.	1923 Quant.	1923 Amount.	1924 (estimated) Quant.	1924 (estimated) Amount.
G. G. C.	—	—	180	7,200	150	6,360	360	14,400
Kaida	24,105	361,575	40,728	610,920	10,500	157,500	27,600	414,000
Pigeon	106,995	1,069,950	253,920	2,539,200	332,220	3,322,200	322,500	3,225,000
Peony	35,115	280,920	—	—	—	—	—	—
Melon	177,775	888,875	—	—	—	—	—	—
Mako	238,020	1,190,100	1,040,800	5,204,000	722,120	3,610,600	900,000	4,500,000
Pheonix	—	—	120,620	603,100	—	—	—	—
Maple	1,457,904	4,859,680	914,112	3,047,040	1,829,640	6,098,800	1,944,000	6,480,000
Total	2,039,914	8,651,100	2,370,360	12,011,460	2,894,639	13,195,460	3,194,460	14,633,400

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* Beginning July

† Estimated.

‡ Approximately 8¼-lb.

Flavoring the Leaf

Fixing the Mouth-piece

Cut Tobacco

	Kwan	Yen	Kwan	Yen	Kwan	Yen	Kwan	Yen
Satsuki	6,030	120,600	13,140	262,800	15,528	310,560	25,000	500,000
Ayame	9,036	144,576	10,086	161,376	15,180	242,880	15,000	240,000
Hagi	4,164	51,091	—	—	—	—	—	—
Total	19,230	316,267	23,226	424,176	30,708	553,440	40,000	740,000

Rough Cut Tobacco

	1921 (9 months)		1922		1923		1924	
	Kwan	Yen	Kwan	Yen	Kwan	Yen	Kwan	Yen
Choju-en	—	—	—	—	250,242	1,668,280	400,000	2,666,666
Ki-en	—	—	86,340	345,360	423,965	1,695,860	400,000	1,600,000
Rough cut-tobacco (no brand)	—	—	7,578	37,890	2,256	11,280	—	—
Total	—	—	93,918	383,250	676,463	3,375,420	800,000	4,266,666
Gross total Amount ..	—	14,470,667		22,418,086		23,331,320		26,300,066

Trimming the Leaf

Packing Cigarettes

Electrification in Java

An interesting item of electrical news has just been made public in the announcement that the first trains on the electrified section of line between Meester Cornelis, a suburb of Batavia, and the port of Tandjong Priok will run on June 1 next. Following the opening of this section of line, electrification work on the Batavia-Buitenzorg line will be at once commenced.

New Book by Hongkong Engineer

As a matter of interest it may be mentioned that Messrs. Crosby Lockwood, have in preparation an illustrated treaties on " Practical Road Engineering," by Mr. Henry E. Goldsmith, executive engineer in charge of roads, Hongkong. The work, which has been written with the assistance of other experts in this branch of engineering, is based on the author's previous book, " Modern Road Construction and Maintenence," which has already gone through two editions.

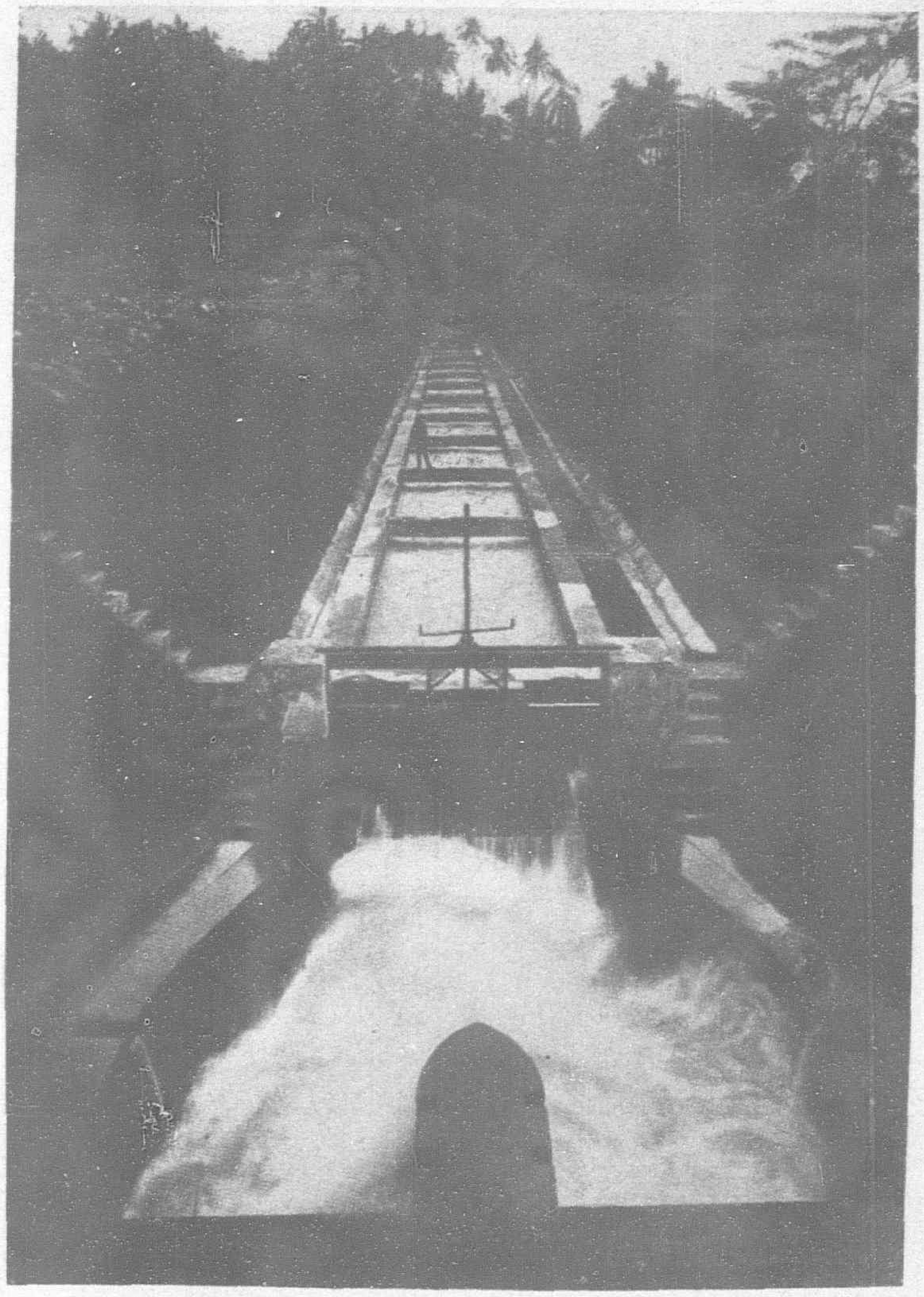
Irrigation and River Control in the N.E.I.

JAVA (with Madura) forms so far the most important island of the D. E. I. and it is therefore not surprising, that, what till the present day has been constructed in irrigation works, has chiefly been achieved in Java. Indeed up till now very few irrigation works have been constructed in the outer districts, though an increasing activity in irrigation matters has been noticeable there in late years.

The following general outline will for this reason almost exclusively refer to Java. The irrigation works thus far constructed in the outer districts were, as a matter of fact, built on the same principles as those in Java.

Rivers

The rivers in Java have nearly all a short course, which is due to the small width of the island. The largest, the Solo river, though running mostly lengthwise over the island, has only a river basin of 15.400 k.m.^{2} (5.950 square miles). The length of the Solo river amounts to 540 k.m. (340 miles), and of the Brantas, the second largest river of Java, which shows the peculiarity to run successively in all the four main directions of the compass, to 310 k.m. (190 miles) with a river basin of 11.000 k.m.^{2} (4.250 square miles). The peculiar characteristics of the rivers in Java are little discharge, sometimes they even entirely drying up in the east monsoon, floods in the west monsoon, caused by the immediately preceding heavy rains. However sometimes there are also large discharges in the first mentioned season.


Banjar-Tjajana Works in the Banjumas Residency. Main Canal Between First Tunnel and Syphon under the Meran River

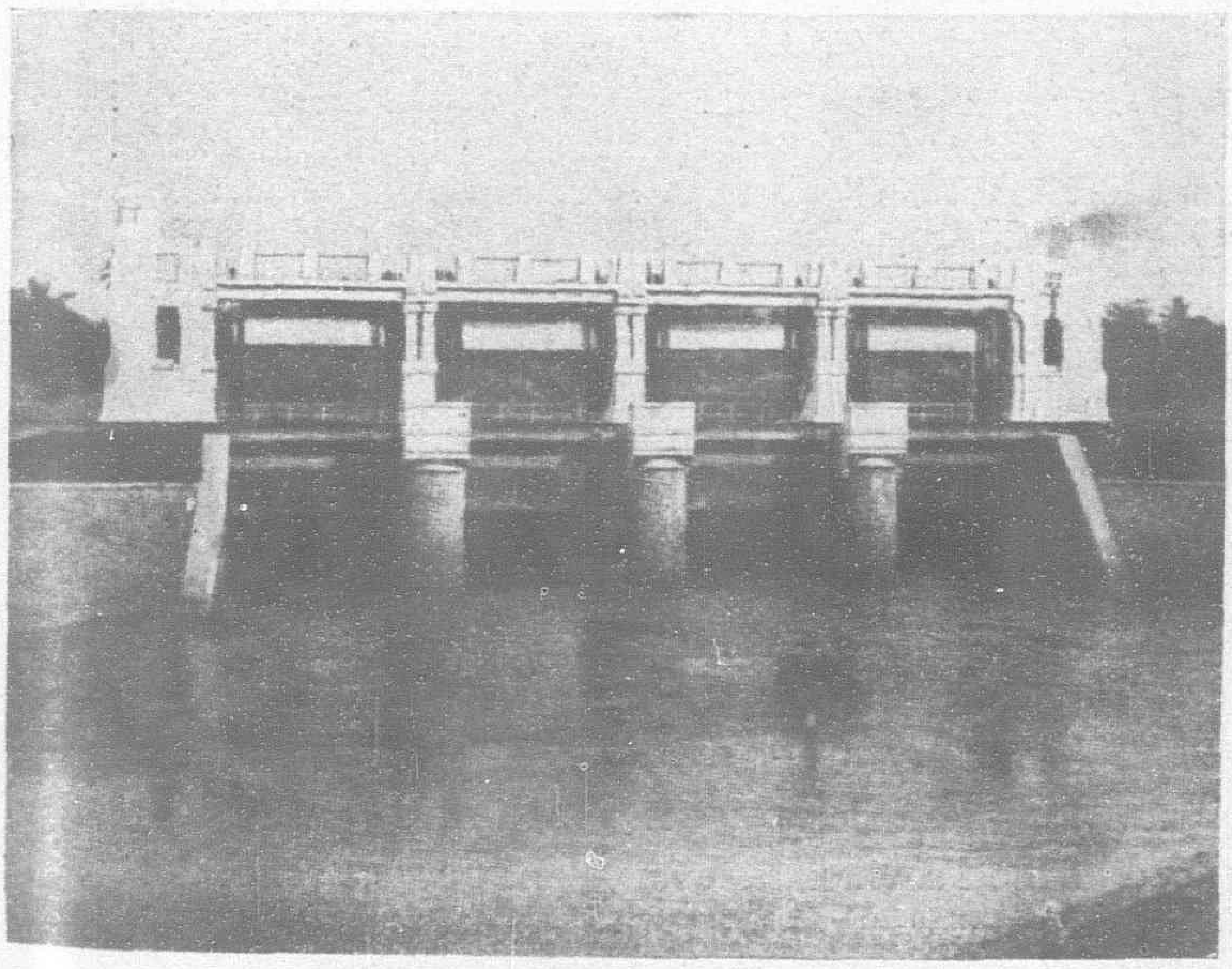
That also, apart from the sudden overflows, provided the position of the water basin is favorable, the water level can remain fairly high, is proved among others by the Bondojudo river, which receives its water from the south-east slopes of the Tengger mountains and of which the waterlevel in the east monsoon compares favorably whit the one in the west monsoon ($\frac{1}{2}$—$\frac{2}{3}$). Also other circumstances, viz.: the nature of the soil of the river basin, exercise sometimes a favorable influence on the waterlevel in the east monsoon.

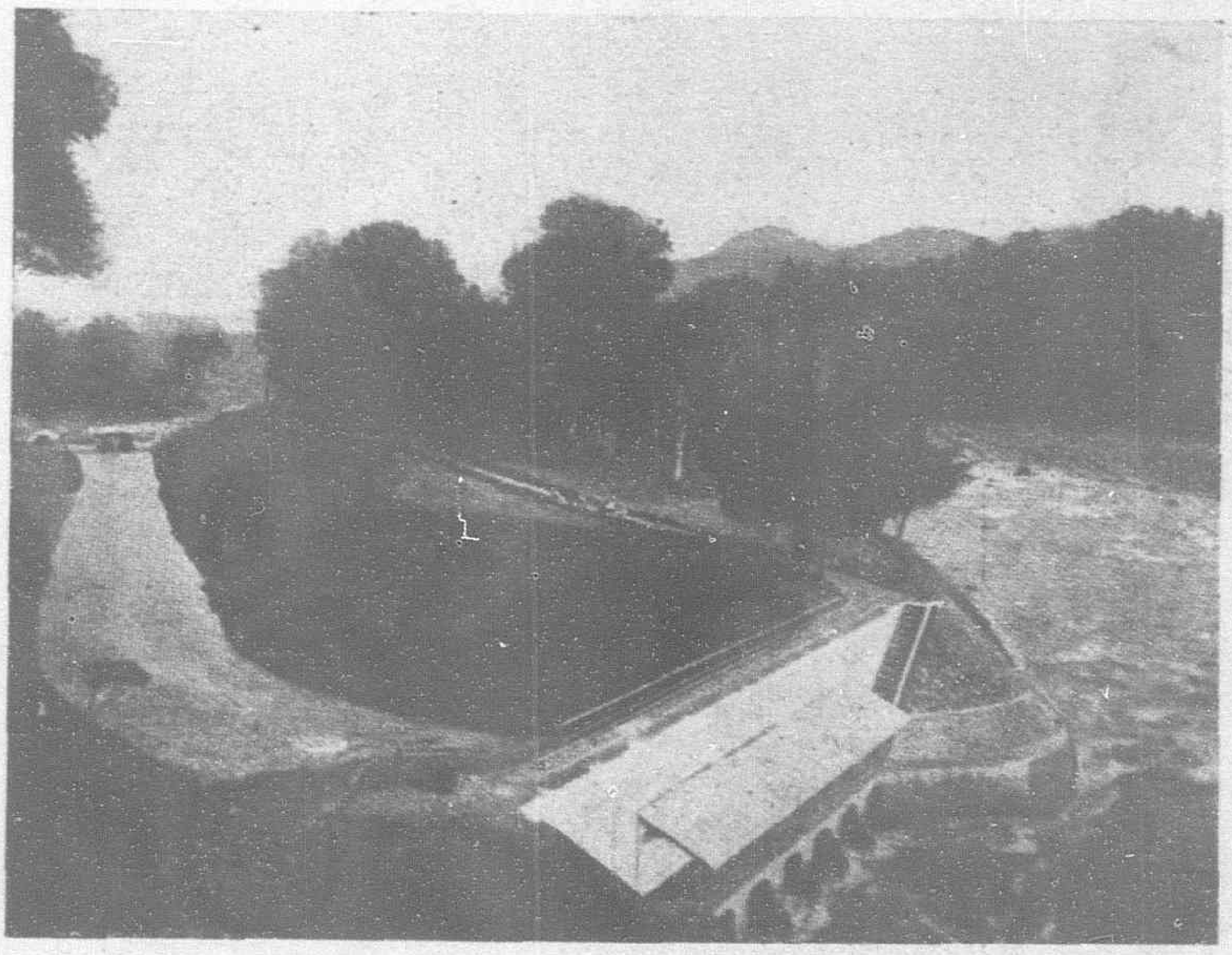
The slopes of the Klut and its loose upper surface of young volcanic material is known as being highly water absorbing.

High in the sand streams of this active volcano, the water disappears in the soil to appear again at the foot in a zone of wells, the water level of which only begins to drop in November.

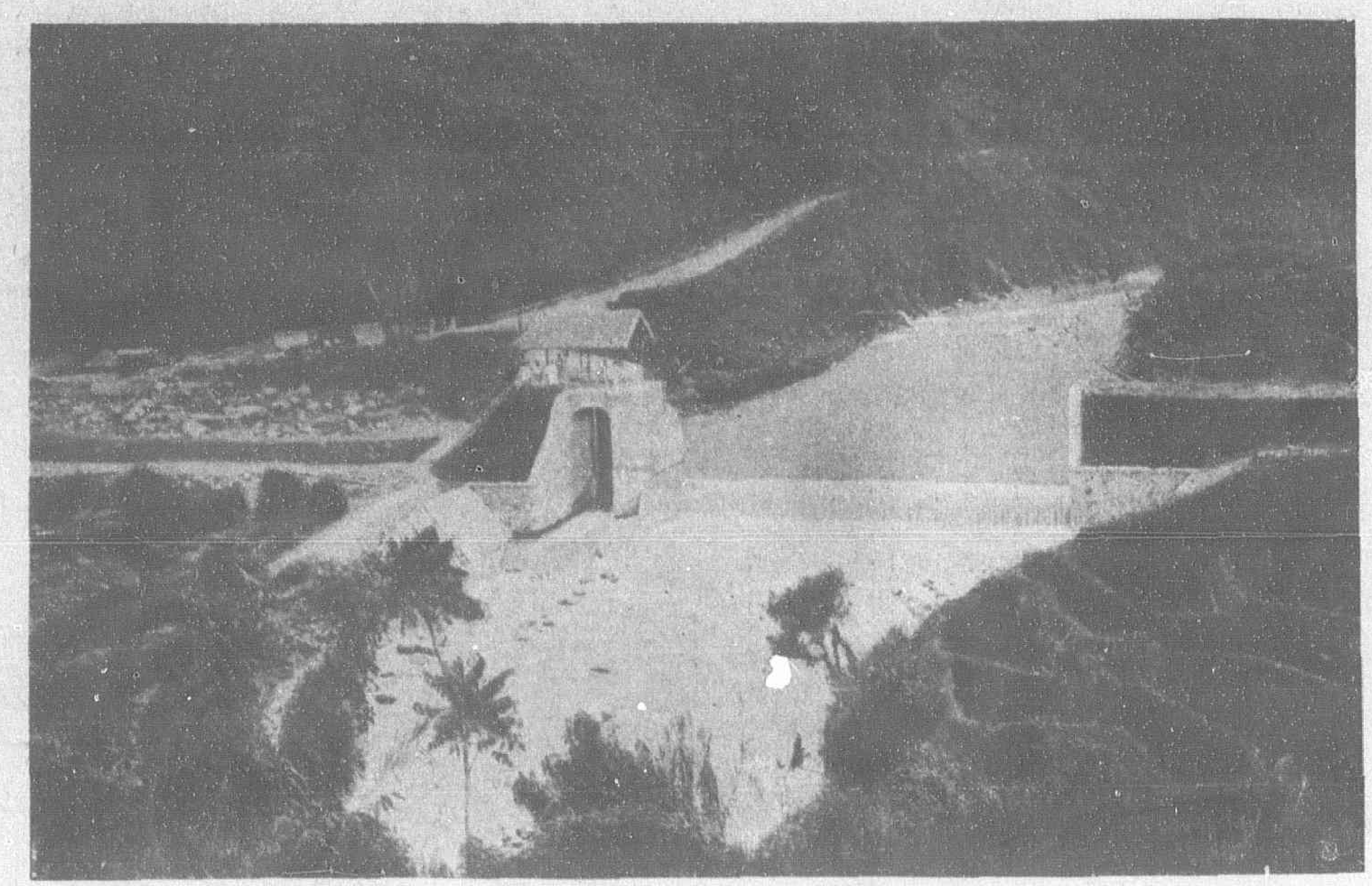
The Merapi and the Slamat are also known as being rich in wells, such as the northern slopes of the Tengger, on which a few springs extraordinarily rich in water, rise at only a few metres above sea level.

As a rule there is however

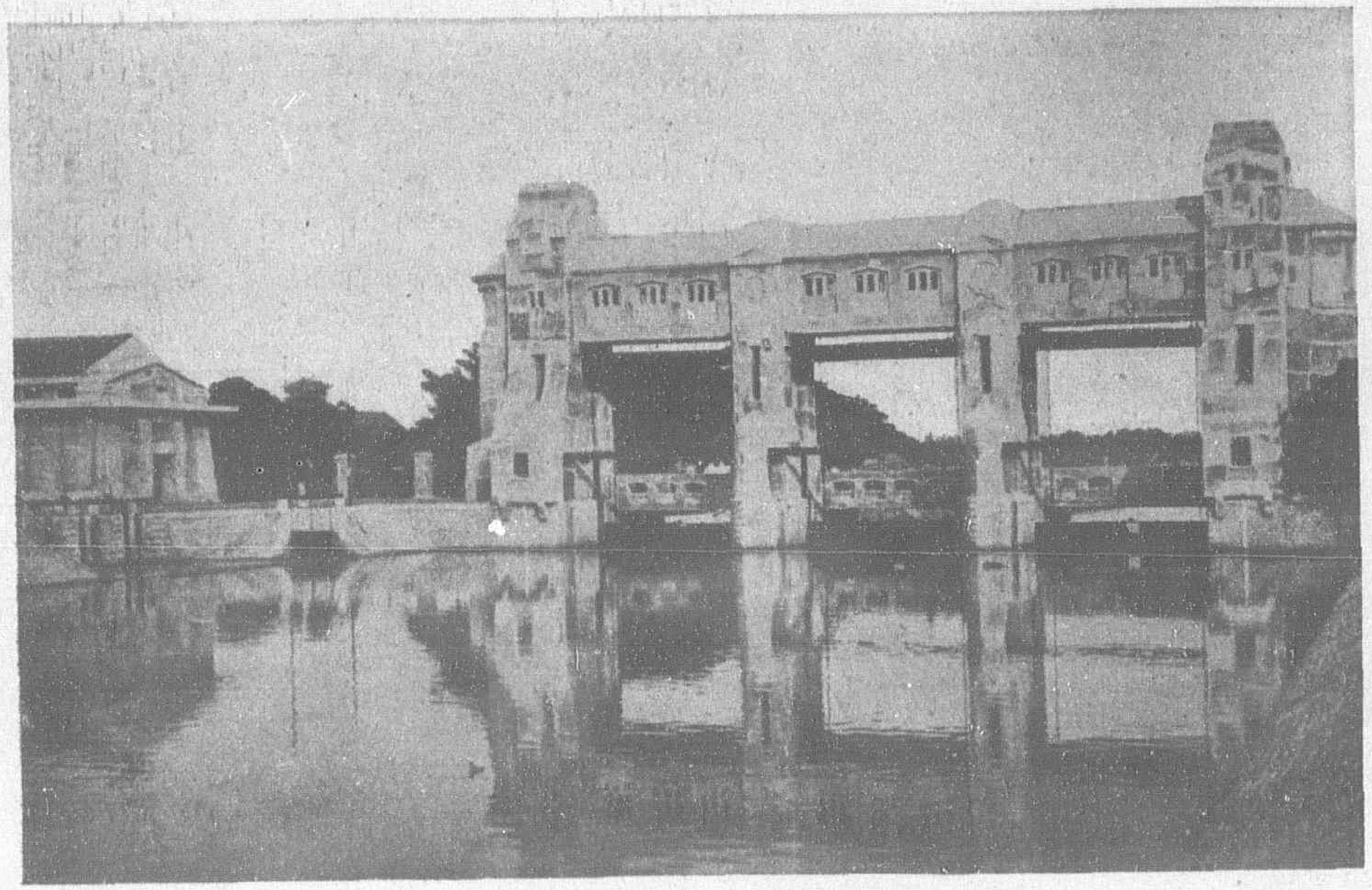

Flood Protective Sluices at Batavia


Head Sluice at Singomerto and Main Canal in the Banjumas Residency: Scouring Sluice in Background

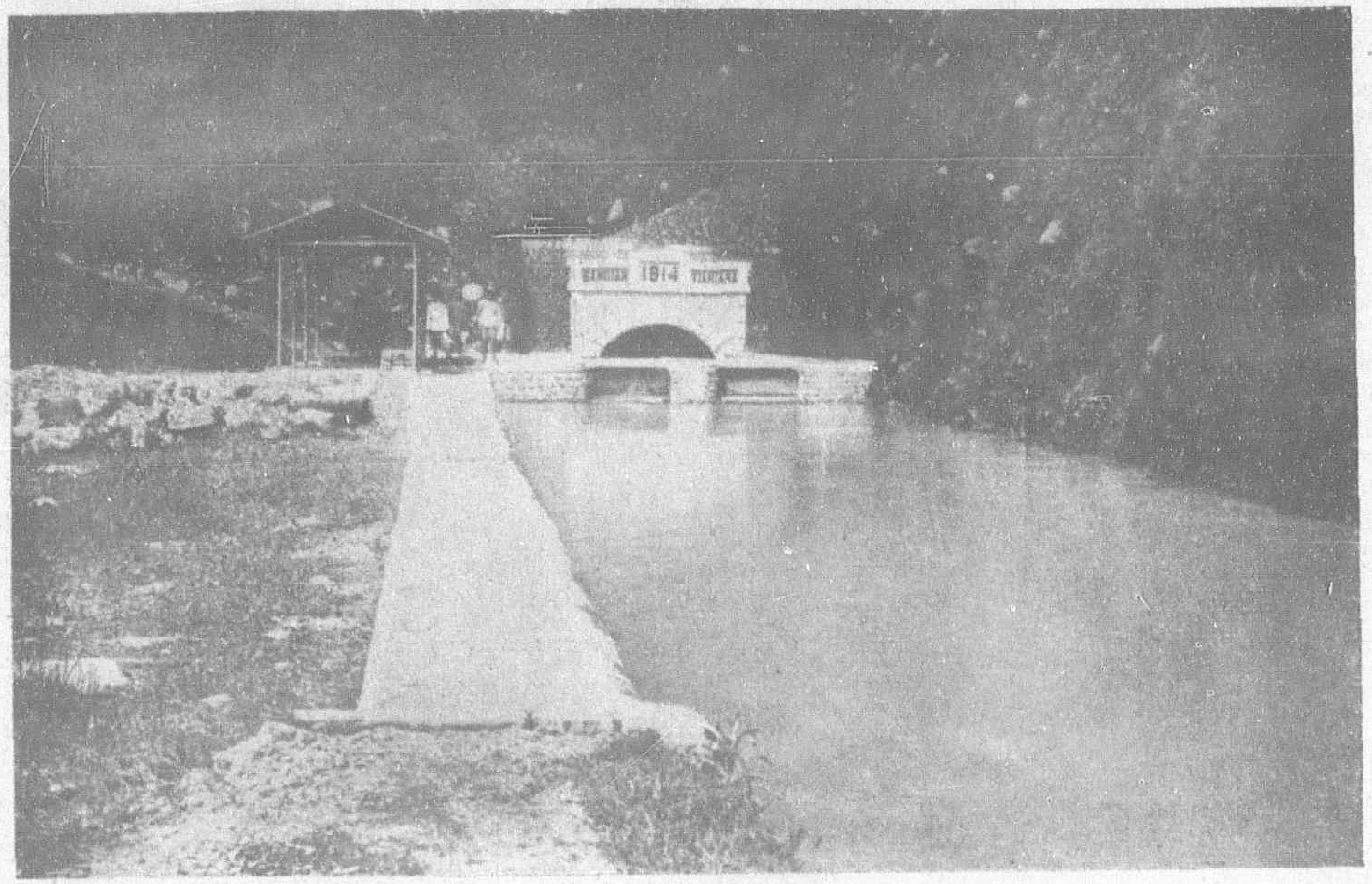
RIVER CONTROL AND IRRIGATION WORKS IN JAVA



Watergate on the Tjiwidej



Sluice Gates at Wonokromo



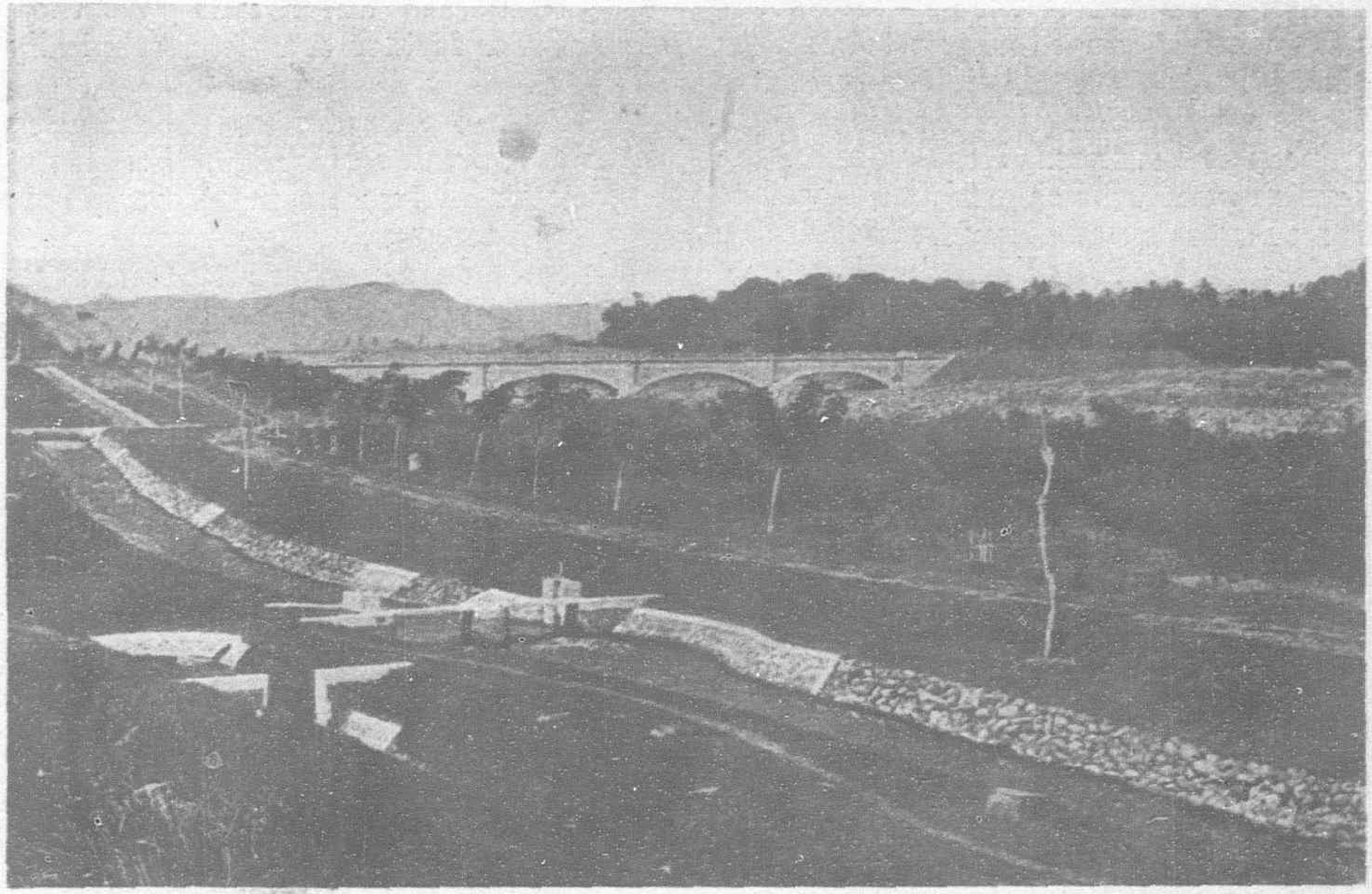
Tunnel at Bandjar

Aquaduct at Leuwikoeja

a great difference between the water levels of the east and west monsoons, even in the large rivers.

In view of the increase in newly cleared land being cultivated and the consequent deforestation, the rainfall becomes very irregular, which has been proved most clearly in Java.

Details regarding the river basins, maximum and minimum discharges of some of the principal rivers in Java, are compiled in the following table :—



Aquaduct in the Goengleiding

Name of the River	Residency	Size of River Basin in Square Miles	Approximate Output Per Second by		
			Normal Highest Output Cub. ft.	Extraordinary Floods Cub. ft.	Normal Lowest Output Cub. ft.
Tjiudjung	Bantam	665	35.000	62.000	710
Tjitarum	Preanger and Batavia	1.500	40.000	—	990
Tjimanuk	Preanger and Cheribon	1.280	25.000	34.000	600
Pemali	Pekalongan	340	25.000	34.000	250
Tjomal	,,	290	20.000	65.000	600
Tuntang	Samarang	240	25.000	39.000	600
Serang	,,	320	18.000	70.000	600
Solo	Surakarta Rembang and Sourabaya	5.950	70.000	90.000	810
Brantas	Pasuruan Kediri and Sourabaya	4.250	40.000	60.000	2.610
Sampean	Besuki	462	18.000	95.000	390

The width of the rivers is in general not very large, rarely more than 200—400 feet ; the depth is very alternately, on the lower course of the Solo river at low water, it amounts from a few d.M. to 10 M. and more. The difference between high and low tide in the Solo river amounts to 6 M. on a distance of 40 K. M. from the mouth.

Intake at Pesajangan, Pekalongan Residency

In a country like Java, especially in the higher regions, with its mostly loose volcanic soil, its moist, warm climate and heavy rains, the water of course carries along a great deal of solid matter : mud, sand and stones.

The highest percentage of mud is shown in the lower Solo river with a figure of 6 and for the Serang river $3\frac{10}{16}$ ounces per cubic feet, while for the Brantas, barring the abnormal condition after the Klut eruption—the last one took place on May 20, 1919—$1\frac{11}{16}$ ounce per cubic feet is given. In Holland they found in the Maas at Grave 2, in the Merwede at Gorinchem $1\frac{1}{8}$, while the mud figure for the Missisipi at New Orleans amounts to $2\frac{11}{16}$. The averages of the mud figures, however, differ considerably more than the limits. At any rate for the Solo river, one comes to an average of $2\frac{3}{4}$ ounces per cubic feet per year, for the Rhine $\frac{1}{16}$ ounce. Considering that the Solo mud has a specific gravity only 1.35 against the Rhine mud of 2, it appears that the Solowater is about 60 times more impregnated with mud than the Rhine water. Should it be possible to spread the mud, carried during a year over the whole river basin, it would, in a dry state, form a layer of a thickness of 1.5 m.M. The Solo river would therefore need 8 months to lower her basin about 1 m.M. According to Guppy, the Po requires 2.4 years for this, the Thames 32.2 year and the Rhine 6.3 years.

In the lower course of the Solo river the mud contains 6 per cent. sand, that one of the Brantas river 21 per cent.

The rivers of Java, owing to their richness in mud, consequently show a strong property to form higher strips along the banks on the lower course after inundations.

The larger rivers of Java's north coast all form deltas, which mostly protrude a long way into the sea and often increase rapidly. At the Tjimanuk delta an increase of 3 K.M. has been observed during the last forty years.

The continuous extension of the lower rivers, combined with their high level, caused more and more drawbacks, as the population grew and agriculture was extended, which led to dikes being constructed everywhere in the lowlands.

Nearly everywhere the native population itself, originally started to throw up dikes in a primitive way, exclusively to promote local interests ; everywhere, however, the dikes have been built too close to the river channels.

On Java's south coast with its deep sea and strong surf no deltas are found.

Agriculture

Before dealing with the irrigations, something should be mentioned about agriculture, as far as the irrigation system is connected with it.

The chief product of agriculture by the native is rice, the staple food of the population.

Principally there are two methods of cultivating rice in Java, viz., the rice culture on non-irrigated fields, practically only still carried on in scarcely populated mountain districts, and further the chief method : the rice culture on the irrigated rice fields, which are tracts, laid out in horizontal terraces, surrounded by low dikes to stop the water. This rice culture is partly dependent on rain, but wherever possible irrigation is applied. The rice fields which depend on rain, may turn out good crops, but this chance is changeable and moreover they miss most of the manuring action of the mud and the substances dissolved in it, which are carried away by the irrigation water.

Though the rainfall in Java compared with British India is favorable and calamitous droughts, which use to cause there the periodical famines, fortunately do not occur in Java, for the reasons mentioned above, irrigation must be considered as being of the greatest importance for the rice culture.

The rice fields are laid out as well in the plains as high in the mountains (up to 3-4.000 feet altitude, higher up rice culture is not possible), even gradients of 1 : 1 the Javanese manages to turn into terraces for the rice culture. The size of the separate fields, surrounded by dikes varies from a few square metres to an even number of bahoes (1 bahoe is $1\frac{3}{4}$ acre=7.100 M^2) in the plains.

The second largest culture on Java's irrigated land is the one of the sugar culture by European enterprises. Regular irrigation in the east monsoon, during which period the cane is planted, to be crushed in the following east monsoon, is a life condition for Java's sugar cane culture. Very little cane is planted by the European estates on non-irrigated land and where this is locally possible, one has to do with loose soil and high water level.

Where sufficient water is available, the native also grows rice again in the east monsoon, so that from some lands year in, year out, twice a year a rice crop is gathered. Where not sufficient water is available during the said season nothing is grown on the heavier soil, while on the lighter soil, so-called secondary crops as maize, cassava, peanuts, soya-beans, sweet potatoes and similar crops, and also, but less generally, tobacco, indigo and cotton is grown.

Native Irrigation Works

Though irrigation has been indigenous in Java since centuries and has also reached a certain degree of development, the native irrigation works suffer from many defects and the natives were not in a position to make use of the large rivers for irrigation purposes without foreign assistance.

The objections to the native irrigation works are chiefly the following: in the first place, the mostly primitive construction of the weir in the river, with, as a consequence, repeated breaches, whereby the river bed and banks at this spot were gradually entirely destroyed.

In the second place the open intakes, whereby when floods occur, the water enters in large quantities and damages the canals, even to such an extent, that the original canals of supply often turn into new river arms, while the real river beds gradually loose their discharging capacity.

In the third place the receiving in the main canal of the crossing discharge canals by damming the original watercourse, while as a rule none or only very insufficient spillways are constructed.

The latter two defects are the cause, that the irrigation canals are not only badly damaged, but also that sometimes heavy inundations occur in the plains.

The fourth objection is, that in the level districts, very often no distinction is made between supplies and discharges, so that in some districts, where the soil is mostly clayey, by obstruction in the water discharge and drainage, the crops may suffer, causing diseases, while on the other hand the irrigation is also disturbed each time by inundations, whereby the primitive weirs in the mixed canals are damaged or carried away entirely.

The consequence of the afore mentioned defects is, that in the long run nearly all big native irrigation works degrade more and more and continuously cause greater difficulties.

However a considerable part of Java's irrigations still exist, especially in the mountain districts, of such primitive works, but at present these have nearly all been placed under technical supervision, so that these defects can be rectified as soon as possible.

Oldest Technical Works; Development of the Irrigation System

Also before the creation of the public works department, which took place in 1854, the government has continuously more or less promoted the irrigation system. Ignorant of local conditions, mostly without proper details concerning the riverbasin, rainfall, outlet and not having sufficient experience of the power of the tropical floods, the Dutch civil engineers were at that time not always lucky with the results of their exertions.

Works, extant to this day, were also created in those years, of which the principal ones have been the works for the improvement of the hydraulic conditions in the delta of the Brantas river in the residency of Sourabaya (the so-called Sidoardjo delta) for a total surface of 48.000 bahoes.

This important work, however, did not form a complete irrigation system, as it only provided for the main water supply.

The first irrigation works, completely technically prepared, designed and carried out, were constructed thirty years later. They are the Demak waterworks in the residency of Samarang, having in view the prevention of further extensive crop failures, which in those districts had already repeatedly led to famine.

The Demak waterworks gave the push to and served as an example for further complete technically designed irrigation works in Java.

The execution of complete irrigation works has been continued without a break since 1885, though not always with great speed, because for a long time, many were of the opinion, which sometimes was also shared by the government, that such works would entail more costs than benefits. The circumstance, that in the D.E.I. up to now, nothing is charged for the use of the irrigation water and also in another way on account of the working of the tax system, the increased crops, after the execution of the irrigation works, are not clearly shown to the public in increased government revenue, has undoubtedly led to the spreading of this unfavorable opinion.

During late years the necessity of a good irrigation system has more and more gained ground, which is shown in the annual amounts spent on irrigation and drainage works, which, after a small decrease in the beginning of the great world war, show a considerable increase, to fall back again in the last few years, due to the necessity of a general cutting down of the government expenditure.

Below follows a table of the amounts spent during a few consecutive years for construction, upkeep and repairs of irrigation and drainage works.

EXPENDITURE ON IRRIGATION AND DRAINAGE WORKS.

Year	Construction glds.	Surveys glds.	Ordinary Upkeep glds.	Repairs glds.
1914	5,389,392	448.074	710,323	75,266
1915	4,347,775	329,006	1,079,880	106,787
1916	5,093,431	414,293	1,504,586	143,902
1917	6,294,136	440,383	1,352,326	145,019
1918	7,275,129	464,410	1,466,571	185,290
1919	7,696,172	460,873	1,658,456	348,387
1920	8,500,904	620,115	1,837,780	599,573
1921	8,805,506	647,173	1,792,130	498,663
1922	5,586,682	446,259	2.026,042	524,842

General Installation of an Irrigation District

The district, irrigated by a river, is subdivided into secondary squares, which as a rule are bordered by discharge canals, the size of which in connection with this, depends on field conditions. The secondary squares are again subdivided into tertiary squares, the so-called terminal squares. In these terminal squares, the size of which lately is fixed as much as possible at about 150 bahoes, the irrigation water is led on the land to be irrigated, direct from the so-called tertiary canals.

From the feeding river the water is led by means of a weir (which, however, is not always necessary) with an inlet sluice into the main canal. By means of distribution sluices, the water is brought into the secondary canals, which divide their water with the help of tapping sluices among the tertiary canals of the terminal canal.

The crossings of the irrigation canals with roads and waterroads takes place by means of culverts, aqueducts or bridges. Superfluous rain-water is removed by spillways from the main canals and led into discharge canals. Finally the irrigation canals are provided, wherever necessary, with gauges, in order to be able to divide the irrigation water among the different canals.

For the discharge of the used irrigation water and the rain water, an irrigation district is furthermore provided with the necessary discharge canals.

Required Quantities of Water, Capacity of the Canals

The capacity of the canals is regulated according to the crod requiring most water, the rice; this culture requires, that the fields are inundated and kept in such a condition for quite some time.

The quantity of water required for this, largely depends upon the conditions of soil; in the first place on the porosity of the soil, further on the gradient of the land and the height of the ground water, which again depends upon the local rainfall.

The comparatively small quantity of water, which the plant absorbs during its growth and the quantity, which is lost by evaporation, which is about 0.32 liters per bahoe and per second during the west monsoon, the season when the rice is chiefly grown, may be considered as practically stable for the whole of Java.

It is entirely different, however, from the quantity, which penetrates into the soil and disappears in this way. This variable quantity is the cause, that the quantities of water required in the different irrigation districts, very often differ to a great extent.

Still as a rule a water supply of 1-1.25-lbs. (liters per bahoe per second) for the period of the full irrigation can be considered as sufficient in the plains. As an example of the course of the water requirements for the rice culture, we will deal here with those in the Pemali irrigation district (residency Pekalongan).

At the commencement of the culture, water is first required for the working of the nursery beds, which take about 1/8 to 1/10 of the total area to be planted. A period of a fortnight is required for the laying out of nursery beds of average size, during which time for each bahoe of nursery bed during 24 hours 35-lbs. of water is required for the soaking of the dried up ground; once the soaking has taken place, not much more water is required.

This quantity tallies with a supply to the main canal 1/8 by 35/14=0.3-lbs.

The time, during which the seedlings remain on the nursery beds, before being transplanted, is about 45 days, which time is used to work the rice fields. For this, also for the transplantation, a supply of 1-lb. is necessary during a month and a half, after which during three months 0.7-lbs. is required. Afterwards the plant needs a couple of weeks to ripen, during which time, however, no water is required.

By combining the various main canals of an irrigation system into groups, which do not start the rice culture at the same time, but at various intervals, one can succeed in connecting the required quantities of water as much as possible to the regimen of the feeding rivers, while it is also possible to restrict the capacity of the main canals.

The Pemali district is divided into five of such groups, which each time start the culture with a space of half a month, with the exception of the last two groups, which, if possible, and this is generally the case, are worked at the same time.

Discharge Canals, Re-use of Used Water

The improvement of the irrigation by the construction of technical works is nearly always, at any rate always in the plains, followed by the improvement of the local drainage, while also in the lowlands one very often has to make an alteration in the course of the larger rivers and to dig, outside their delta, a shorter new mouth to the sea, so as to be protected from floods and inundations by the rising of the high water.

Also with the construction of entirely new irrigation works in still undeveloped districts, often considerable works were found to be necessary for the drainage of the water. This is especially the case when bringing into cultivation the swampy jungle districts in which it is not a rarety, that the riverbeds mostly run blind.

The construction of water protecting dikes along the big waterways in Java's lowlands, cannot, as a rule, be eliminated.

When improving irrigation works, this as a rule, must be provided for, a provision, which may cause a considerable expenditure, owing to the mostly dense population of the river banks. This circumstance often makes it cheaper simply to alter the mouth of the river.

In the construction of the older irrigation systems, the view was taken, that the irrigation water, which reaches the discharge canals, should not be used any more for irrigation purposes. Though this objection was not always based on the fear, that the used water should be injurious to agriculture, one was still of the opinion, that the so much more salutary fresh water with the foodstuff floating and dissolved in it, should be used exclusively on all soil of an irrigation district, even if the quantity of water, available for each bahoe, would be greatly reduced by it. Also it was feared that the necessary leveling up of the discharge canals, when re-using the water, would have an unfavorable influence on the general drainage conditions and would eventually lead to diseases in the crop.

Later on this principle had more or less reluctantly to be dropped. The population itself gave the example in this instance, by secretly damming the discharge canals in the rainy season, which naturally, threatened to call into existence again the same objections, which one tried to avoid by introducing the improvement works. Also the quantity of water, accumulating in the discharge canals, sometimes proved to be much more than one had imagined. At present one hesitates no longer, wherever necessary or advisable, to use once more the water from the discharge canals into which movable weirs are constructed for this purpose.

Below follows a table of the total area of the irrigated districts in Java and Madura at the end of 1919:

	Number of H. A.	per cent.
1. Irrigation districts, for which permanent works have been put in use	803.346	21
2. Ditto, for which permanent works are under construction.	239,417	6
3. Ditto, for which permanent works are being studied or planned	544,218	14
4. Irrigated land and land dependent on rain, for which no plans exist	233,000	59

Irrigation from Reservoirs, by Means of Pumps, etc.

Very little has come so far of the construction of large reservoirs in Java. In connection with the rainfall in the west monsoon, favorable for the rice, though irrigation is of the highest importance for this crop, the costs of construction of large reservoirs, generally speaking, would be too high, to be paying for the rice culture at any rate in comparison to the revenue with the present native system of production;

This is still less the case with regard to the so-called secondary crops (maize, cassava, etc.) It is different with regard to the European sugar-cane culture, in the interest of which repeatedly plans have been brought forward for the erection of large reservoirs.

The condition of the soil is on the whole not very favorable for the construction of large reservoirs. The slopes of the volcanoes are generally too porous for large reservoir dams, for which they offer indeed little opportunity, while in the tertiary hill districts the marl and chalk formations very often do not offer a safe base to reservoir dams, while one also has to reckon with the manifold earthquakes in some of the districts, so that very little has come so far, of the various plans for the erection of large reservoirs.

The largest reservoir built, up to now is the Wadoek Pridjetan in the Solo valley with a capacity of 9 million cubic metre, constructed in the valley of the small river of the same name, which in previous years, caused a lot of trouble, owing to the sometimes heavy floods and the inundations caused by it.

There are several smaller reservoirs in Java, constructed by the natives, especially in districts, where the rainfall is poor, such as in the Solo valley; they are mostly formed by damming small valleys. Also a few crater lakes are used on a small scale as reservoirs, as for instance the lake of Ngebel in the residency of Madium, on the west slopes of the Wilis, and the small Telaga (lake) Pasiz on the east slopes of the Lawu in the same residency.

Irrigation by means of pumps has not been found paying so far for native plantations, but is very much applied for the sugar-cane fields of the European sugar estates. As a rule, the water which collects in the discharge canals is profitably used again by pumping it to the sugar-cane fields by simple easily removable centrifugal pump installations.

On a large scale, water is pumped from the rivers by stationary pumping stations (of which are many with a capacity of 1 M^1 per second) to supplement the output of the irrigation canals and sometimes also to feed small irrigation canals which have been especially constructed for the irrigation of complexes of sugar-cane estates, which otherwise would not receive any irrigation water. The pumping of artesian or ground water for irrigation purposes, such as on the Hawaiian Islands is carried out on such a large scale, is only done by a few sugar estates and even then only on a limited scale.

Flood Protective Work

A factor, which is of the greatest interest for all cultures is the care for a regular discharge and protection against the water, so that, besides irrigation and discharge works, also embankments have been constructed or are under construction. The most important flood protective works constructed for this purpose, are those to prevent floods from the Solo and the Brantas river, also those to safeguard the capitals Batavia and Sourabaya from floods.

Finally a few words should be said about the struggle against the unfavorable effects of the material, discharged by the active volcanoes. The rivers rising from the slopes of these volcanoes, sometimes change into veritable sand or mud-rivers, which, in leaving the original bed, destroy everything that is in their way.

As regards the Klut it is a highly unfavorable circumstance, that a lake is always formed in the crater, the water of which is thrown out with an eruption, immediately forming mudstreams, causing death and destruction. The great loss in life and the enormous damage caused by the last eruption in 1919 by this volcano has led to an effort, which is now being carried out by the service of the mining department, to cut a tunnel through the volcano slope, which will make it possible to drain the crater. Should this effort succeed, for which there is every chance, most certainly a very beneficial victory will have been gained on nature.

Besides the Klut, especially the Smeru (residency Pasuruan) and the Merapi (residency Surakarta), the excrements of which cause a lot of damage, are a danger and nuisance and necessitate continuous watching and interference. The fighting of the so-called sand trouble of many of the rivers, rising from the slopes of these mountains, belongs to the heaviest and unfortunately most thankless task of the hydraulic engineers in the D. E. I.

Below follows a survey of the expenditure on construction, upkeep and repairs of dams during a few successive years:

EXPENDITURE ON FLOOD PROTECTIVE WORKS.

Year	Construction	Ordinary Upkeep	Repairs
	glds.	glds.	glds.
1914 ...	901,214	123,885	41,100
1915 ...	790,202	142,131	1,131
1916 ...	826,516	153,061	120,148
1917 ...	1,018,365	172,710	224,646
1918 ...	2,069,224	198,558	465,878
1919 ...	1,336,957	275,415	252,860
1920 ...	1,484,554	271,630	442,347
1921 ...	1,915,609	241,989	169,749
1922 ...	1,364,621	221,041	28,214

Organization of the Irrigation Service

Irrigation, drainage and flood protective works were, so far, almost exclusively constructed by the government under the management of the department of public works, as its technical section for irrigation, drainage and flood protective works is more especially in charge of these works.

The technical irrigation service resorting under this department are, as far as Java and Madura are concerned, to be distinguished in:

I. Service of construction (special services) and
II. Service of exploitation (irrigation sections).

I. Services of Construction

These are, in the first place in charge of the making of surveys, measuring of water quantities and other observations, the designing and estimates of plans and the execution of works of the above described nature.

The leader is a chief-engineer or engineer, who is directly subordinate to the chief of the department and who has a staff of personnel (engineers, architects, surveyors, native superintendents and foremen).

Even after new works have been partly finished, the exploitation of these is, for the time being, put in charge of the construction service, which afterwards gradually, partly or entirely passes into the exploitation service.

II. Services of Exploitation

For the exploitation of the irrigation works, irrigation sections have been created in Java, which comprise in general the stream and irrigation district of one or more large rivers and derive their names from these rivers,

Probably in due time, Java will be divided altogether in such sections.

A chief-engineer or engineer is in charge of an irrigation section, who in technical matters is directly subordinate to the chief of the department, but from an administrative point to the relative resident(s). He is assisted in the management of the irrigation works by the heads of the section, in which the irrigation sections have been subdivided, and by engineers, architects, surveyors, native superintendents, foremen, etc.

Besides the management and the exploitation of all irrigation works and waterways within their district, the chiefs of the irrigation sections are also charged with the surveying, designing and construction of waterworks within their territory, as far as no special construction service has been appointed for it, while sometimes they are also in charge of the construction of roads, and in exceptional cases also have the supervision of small harbors.

Agricultural advisors, who are stationed in most of the residences take care of the agronomical interests of the irrigation system about which they give advice to the residents or also direct to the irrigation engineer.

The water supply is based on strict regulations, while heavy penalties are imposed for any offence against these regulations.

At the beginning of 1923 the personnel of the irrigation service in Java and Madura consisted of: 100 chief engineers and engineers, 9 architects and 176 surveyors.

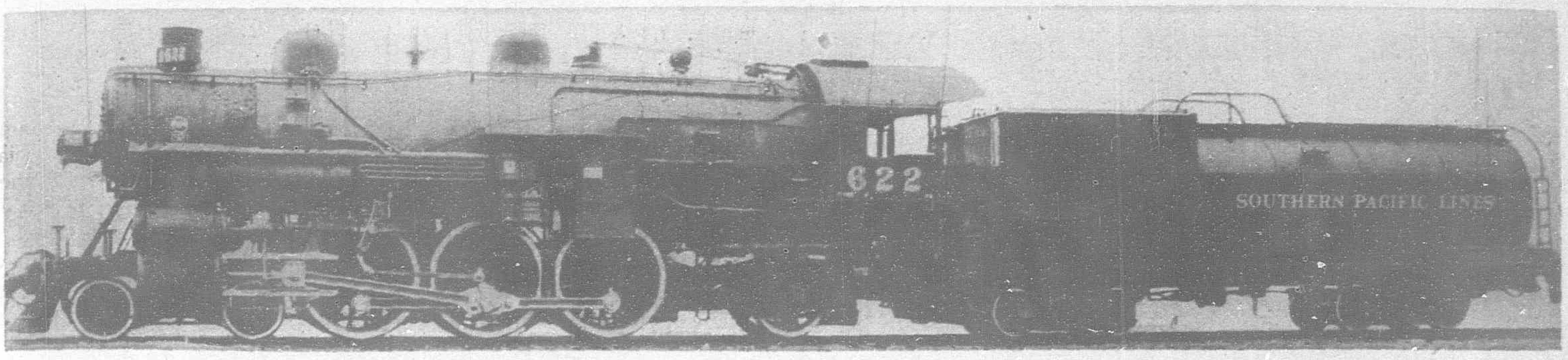
Does Agricultural Improvement Pay?

By T. F. Tung

THE college of agriculture of the national south-eastern university of Nanking has been devoting its energy to the improvement of cotton, rice and wheat for five years and up to the present the results are reported satisfactory. There are three cotton experimental stations of the college at Kiangpoo in Kiangsu, Wuchang in Hupeh and Chenchow in Honan disseminating improved cotton seeds to 323 neighboring farmers, which were planted in 1,771 *mow* of land. As shown from the reports of these farmers, the minimum yield of seed cotton per *mow* from the improved seeds was seventy catties and the maximum yield, about 150 catties. On the average, the yield per *mow* which the farmers got with the improved seeds was at least twenty catties more than that of other cotton farmers near the stations not using the university seeds. The improved rice seeds were also disseminated last spring to farmers near Dah Shen Kwan experimental station. According to their reports the increase in yield per *mow* was more than one *ton* or one-tenth of a *dan*. Mr. C. C. Nieh, formerly chairman of the chamber of commerce of Shanghai and now a member of the board of trustees of this university, in his recent letter to Dean P. W. Tsou asking for improved seeds of cotton and rice, expressed sincerely his idea about the good work of rice improvement which this college is doing. His letter contained the following statement:—

"The result as obtained from the planting of improved rice seeds supplied by this college in 1923 was remarkable. The yield was about ten per cent. more than that of the ordinary farmer. We expect to have two or three *dan* more of the newly improved seeds tested in several places, and wonder if you will supply us with so much."

The expert workers on cotton improvement are Profs. T. S. Kuo, E. L. Sun, S. C. Wang, T. Y. Yeh and C. C. Hsu, and the one on rice improvement is Prof. C. C. Yuan. Through five years' intensified research work they have accomplished much in their enterprises, and if the work is extended to a large extent Chinese agriculture will be greatly benefited. It is estimated that in Kiangsu province the area devoted to cotton planting is more than 12,000,000 *mow*. If there is an increase in yield of twenty catties of seed cotton in every *mow* the total increase of product from the land will be about 2,400,000 piculs. As each picul sells about fifteen dollars the total increase in income of the Kiangsu farmers from the increase of yield will be $36,000,000 a year. Then again the area of land in Kiangsu under rice is about 28,000,000 *mow*. If an increase in yield of one-tenth *dan* of rice is produced from each *mow* and if each *dan* sells five dollars, then the total increase of income from the total increase of crop (which is about 2,800,000 *dan*) will be $14,000,000 a year. This assumption is made on the basis of two of many crops that grow in China and is limited to this province only. If the improvement work reaches every agricultural section of the country, what a large revenue our Chinese farmers will receive from their work! Is it unjust to assert that the agricultural improvement is the most important and fundamental way to solve the life problems of the Chinese people?

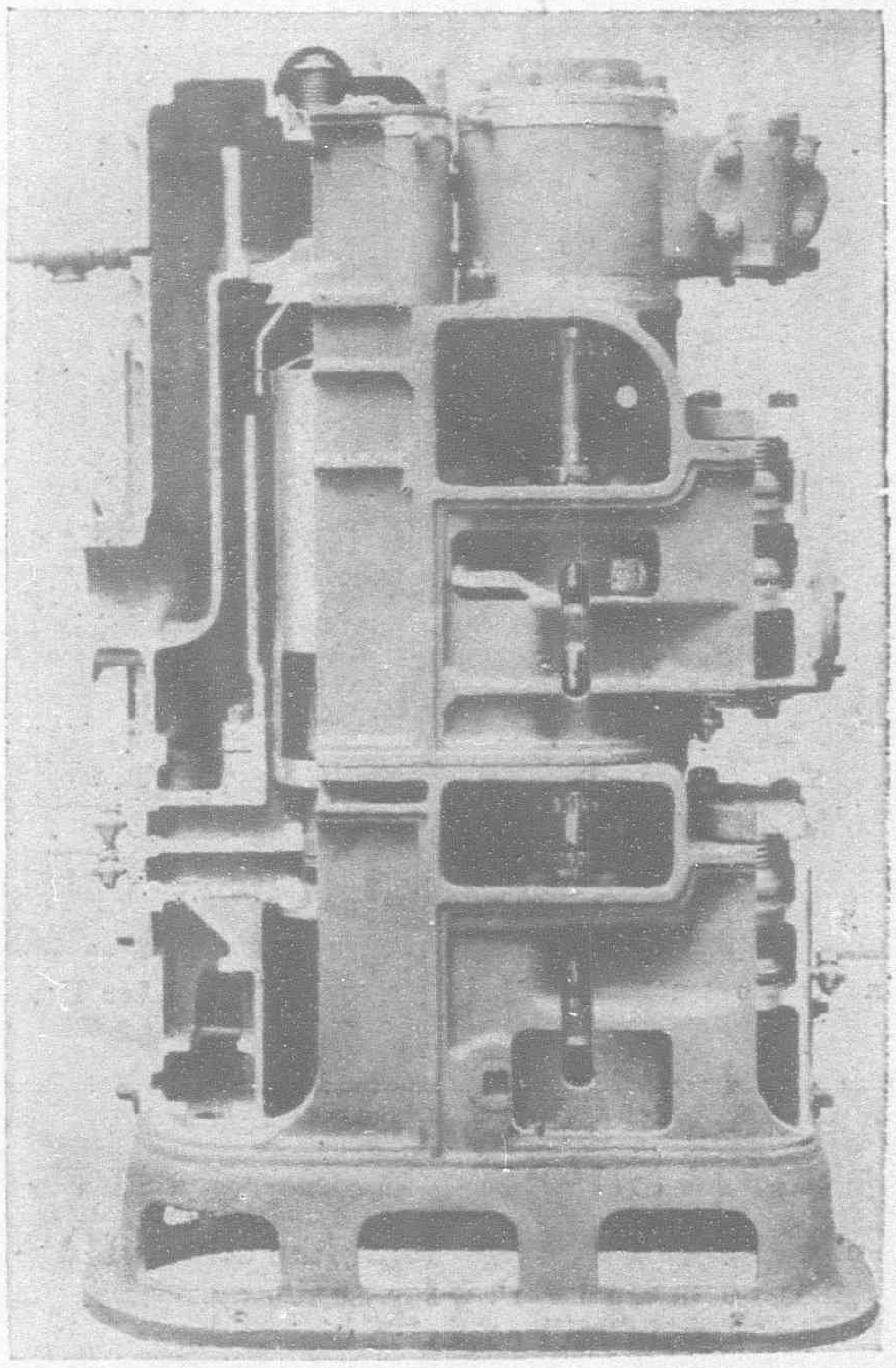


Southern Pacific Locomotive Equipped with Worthington No. 3 Boiler Feed Pump and Feed Water Heater 45,000 lbs. per hour (90 gallons per minute) Capacity

Worthington Locomotive Feed Water Heater

THAT the new Worthington combined feed water heater and feed pump for locomotives has proven everything that the manufacturers claim for it is evidenced by the remarkable increase that has taken place in the use of the Worthington apparatus during the comparatively short time that has elapsed since it was first placed on the market. At the present time this Worthington heater is being used by over thirty railroads in North America and on thirty-three railroads in countries outside of the United States. Two of the largest railroad systems in the United States have adopted these Worthington heaters as a standard and have several hundred of them in use.

In each of these cases the heaters were subjected to the severest trials and tests under actual working conditions and with special reference to different kinds and grades of fuel, and with feed water as found in the different parts of the country. Observations were also made as to the influence of the different seasons of the year upon the results obtainable. The difficulties overcome in this latter respect alone will be better understood when it is stated that in the northern part of the United States extremely cold weather with great quantities of ice and snow are encountered during the winter season, while in the summer, practically tropical conditions prevail in the southern portions of the country. There are localities in Canada where these Worthington heaters encounter variations in temperatures from 100 degs. F above zero to 53 degs. F below zero, and their operation is perfect under these extreme climatic conditions. During a period of about four years the Worthington heater has been required to meet every possible combination of these exacting conditions, and its eventual adoption as a part of the standard equipment for locomotives by such a large number of progressive railway systems in the United States and abroad is an achievement that, as far as we are aware, has not before been equalled in the case of any similar class of apparatus.



Sectionalized Size No. 2—Type B. Worthington Locomotive Feed Water Heater and Pump, Front View

During recent years the price of fuel has risen so rapidly that the engineering world has found it necessary to make a special study of the development of heat-saving devices, and the application of the Worthington heater to locomotive service is one of the outstanding results of these efforts toward heat conservation. In comparing the desirability for the development and use of apparatus of this kind as between the stationary power plant and the locomotive, which may be described as a portable power plant, it is clear that the necessity for same is by far the greatest in the latter case. A locomotive is compelled to carry both the fuel and the water through which its power is to be produced. Therefore, any saving that can be effected in the use of these materials is equivalent to reducing the quantities of same that have to be stored and carried. Furthermore, this saving also has the effect of increasing the power that can be obtained from a given quantity of fuel and water and to that extent increases the power output of any given size of engine.

It will be noted also that not only is it possible to carry a lesser quantity of water, but that a large percentage of the exhaust steam, which in the ordinary type of locomotive is entirely lost by being exhausted into the atmosphere, is recovered by condensing the same in the heater. The heat in the exhaust steam is also saved, and with the condensed steam in the form of hot water is returned directly to the boiler. Careful tests have also proven that an important saving results from the fact that the condensation of the exhaust steam in the heater reduces the back pressure of the exhaust upon the main pistons of the engine.

The heater portion of this Worthington combination is what is known as the "open type," and does not require the use of tubes like those used in the closed heaters and which have always been found to be source of trouble. In the Worthington open heater the exhaust steam and the water mingle in the steam chamber and the water is heated by direct contact with the same, producing the highest possible degree of efficiency.

The pump is of the direct acting type with a special form of steam valve gear which is undoubtedly the most economical and reliable form in its class that has ever been devised. There is one pump cylinder for handling the cold intake water and one pump cylinder for pumping the heated water directly to the boiler. Only one steam cylinder is used to operate both of these pump cylinders.

In the adaptation of this Worthington combination for use on the locomotive, the best principles of modern practice were adopted, with the idea of producing a unit that would be a model of simplicity, and that would be easy and inexpensive to supply to operate and to maintain. The simplicity of this Worthington unit is a guarantee of absolute minimum cost of maintenance, and the surprising results that are being obtained in this respect are indicated in the tabulations given below.

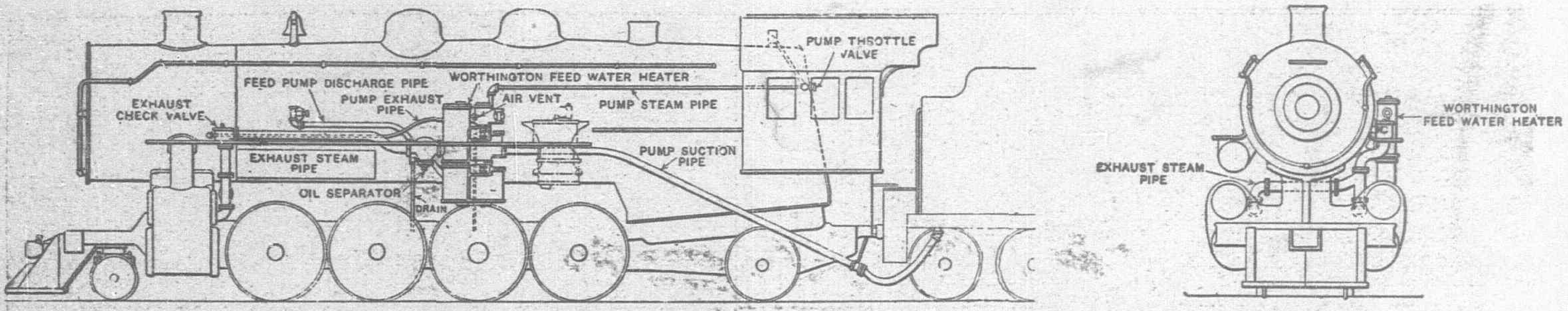


Diagram Showing Application and Piping of Worthington Locomotive Feed Pump and Feed Water Heater

A minimum of piping and fittings is required, and the apparatus is not influenced by the accumulation of scale, etc., from poor water either in its operation or in its heating effect. The heater proper and the entire water supply to it comprise a low-pressure system. Inspection when required is a most simple matter, as the heater is not a part of the locomotive itself and every portion of same is most conveniently accessible. We mention some of the good points of the heater that are most appreciated by locomotive engineers. Where a Worthington heater is used, it is not necessary to fill the boiler while the engine is standing still, in order to be ready to start up. Neither is it necessary to fill the boiler on the down grade in order to be ready for the next up grade. These things are possible because of the small steam consumption of the Worthington steam pump that is used with this heater, as compared with the consumption of the ordinary injector. Furthermore, the air vent on this heater is so arranged that temperatures above the atmospheric pressure are obtained. In fact, with a back pressure in the locomotive cylinders of eight or ten pounds, the temperature of the feed water delivered to the boiler will be within ten or twelve degrees of the temperature of the exhaust steam. The question is sometimes raised regarding the possibility of oil getting into the boiler feed water through the heater. Absolutely no trouble of this kind has ever been experienced with a Worthington open type of heater.

A cut is illustrated herewith showing a cross section of the Worthington combined heater and feed pump, and from which a clear idea may be obtained of the general arrangement and construction of same. An illustration is also shown of a locomotive with one of these heaters mounted and in use. A line cut shows the disposition of the connections of this heater in place. Another cut shows the external appearance of the combined heater and pump. In actual service and comparing the actual results obtained with the same locomotive when using an ejector and when using the Worthington feed water heater, it has been found that the coal saving per I. H. P. with the locomotive operating at or near maximum capacity is from 12 to 15 per cent. Another method of comparison is that adopted by the American railway association committee, based on the rise of temperature of the feed water. On this basis, it is found that the rise in temperature for heavy trains ranges from 130 degs. F to 185 degs. F with an average of 150 degs. F. For light trains, the rise in temperature ranges from 92 degs. F to 175 degs. F with an average of 144 degs.

Type of Locomotive	4-6-2	2-8-0	2-8-2
Average steam pressure in lbs. per square inch	201.6	203.5	173
Percentage of fuel saved over operation with injector ..	12.6%	14.1%	15%
Percentage of increase of water evaporated per pound of fuel over operation with injector	13.7%	20%	16.55%

The principal results obtained by the use of these Worthington feed water heaters on locomotives are the following :—

1.—Longer life to boiler tubes because of absence of scale and mineral deposits.

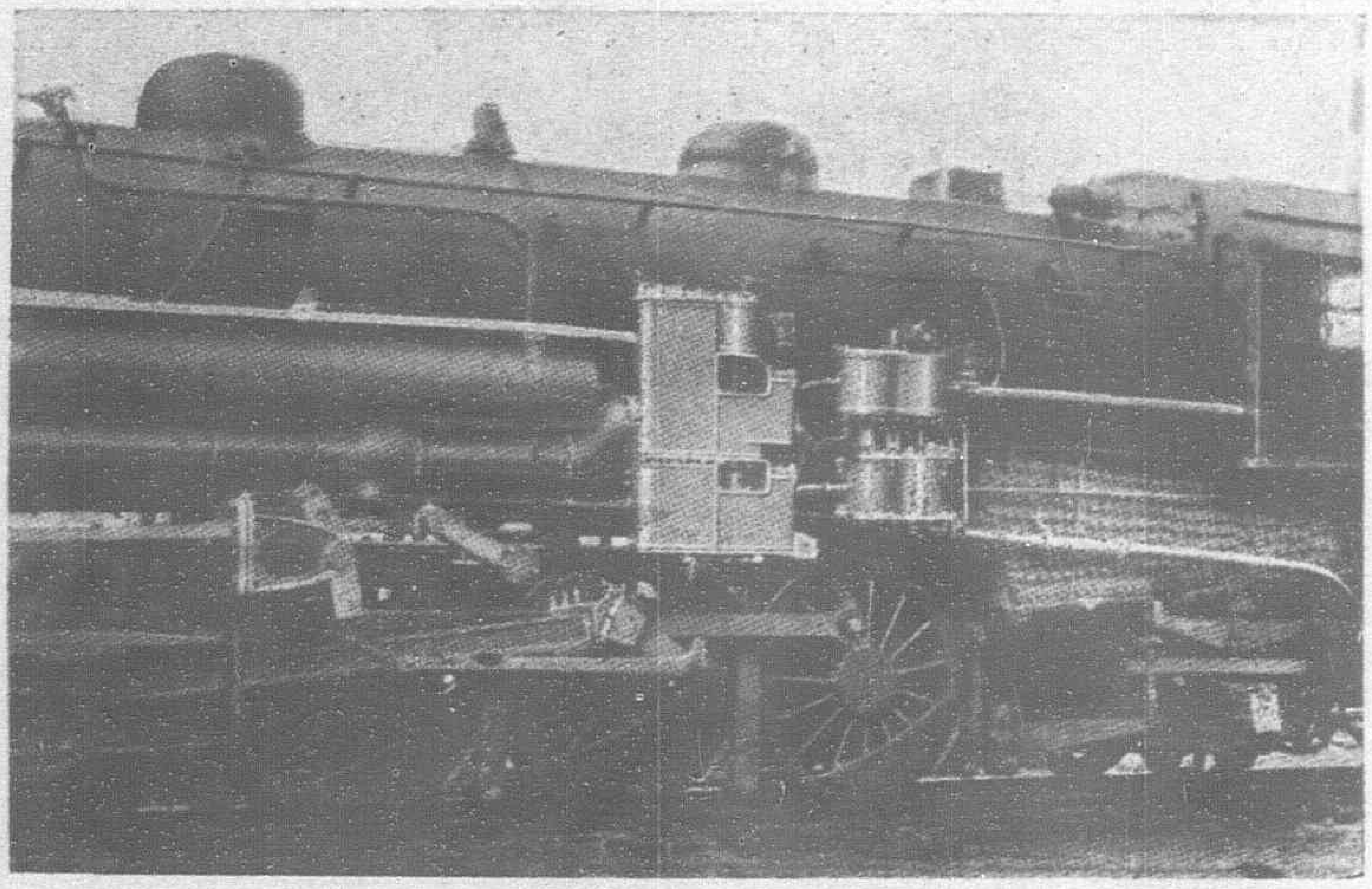
2.—A reduction in the amount of fuel required to produce a given amount of power.

3.—Less water is needed for the same work.

4.—The reduction in back pressure on steam pistons renders the locomotives easier to handle and more powerful.

5.—It has been found that the saving in fire box maintenance alone, without considering any other economical feature, is so great as to make the investment in a Worthington heater fully justified.

That these are real and practical gains over locomotive feed with injectors is unhesitatingly attested to by all locomotive engineers who have operated or have observed the operation of the Worthington open feed water heater and pump for locomotives.



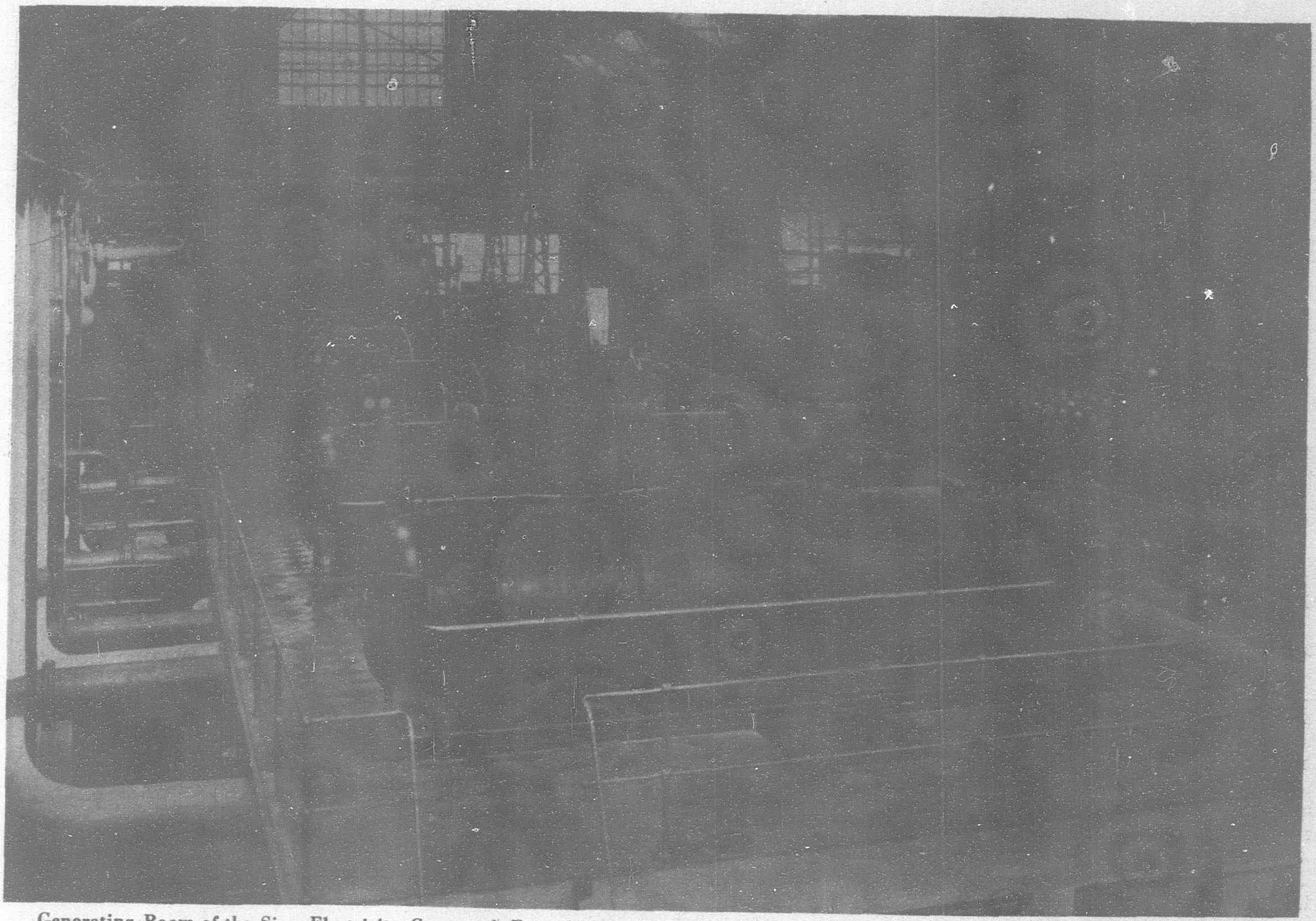
Worthington Locomotive Feed Pump and Feed Water Heater in Mikado Type Locomotive

Sugar Rolls

ANOTHER instance of the application of electricity to rolls in the raw sugar industry is an installation to be made by P. Costas, Bercetche & Mosoteguy in their San Martin mill at Tabacal, Argentina. This is the first application of its kind in that country. The plant is already well electrified, but mill expansion caused the owners to extend the use of electricity to driving the rolls, a practice not yet universally adopted in the sugar industry.

An extension to the present mill is to be erected and complete electrical equipment has been ordered from the General Electric Company of America, through the Argentine General Electric Company, agents of the International General Electric Company. Two 1,250-kilowatt, variable speed turbine generators have been specified, one of which will supply power to the motors driving the rolls; the other will be used as a spare, both for the roll drive and for auxiliary power. Seven 300-horsepower, variable speed induction motors have been ordered. Six of these will be used regularly for driving the rolls while the seventh will be a spare. Other electrical equipment will include switchboard and control apparatus, together with a number of auxiliary motors.

Another unusual feature of the installation is the adoption of a motor-driven governor adjuster. This will permit remote control of the frequency of the turbine from the roll room by adjusting the governor by means of push-button stations. The whole grinding operation is thus under the control of the operator in the roll room. A frequency meter on the same panel with the push-button station will enable the operator to ascertain at any time the speed at which the rolls are running.

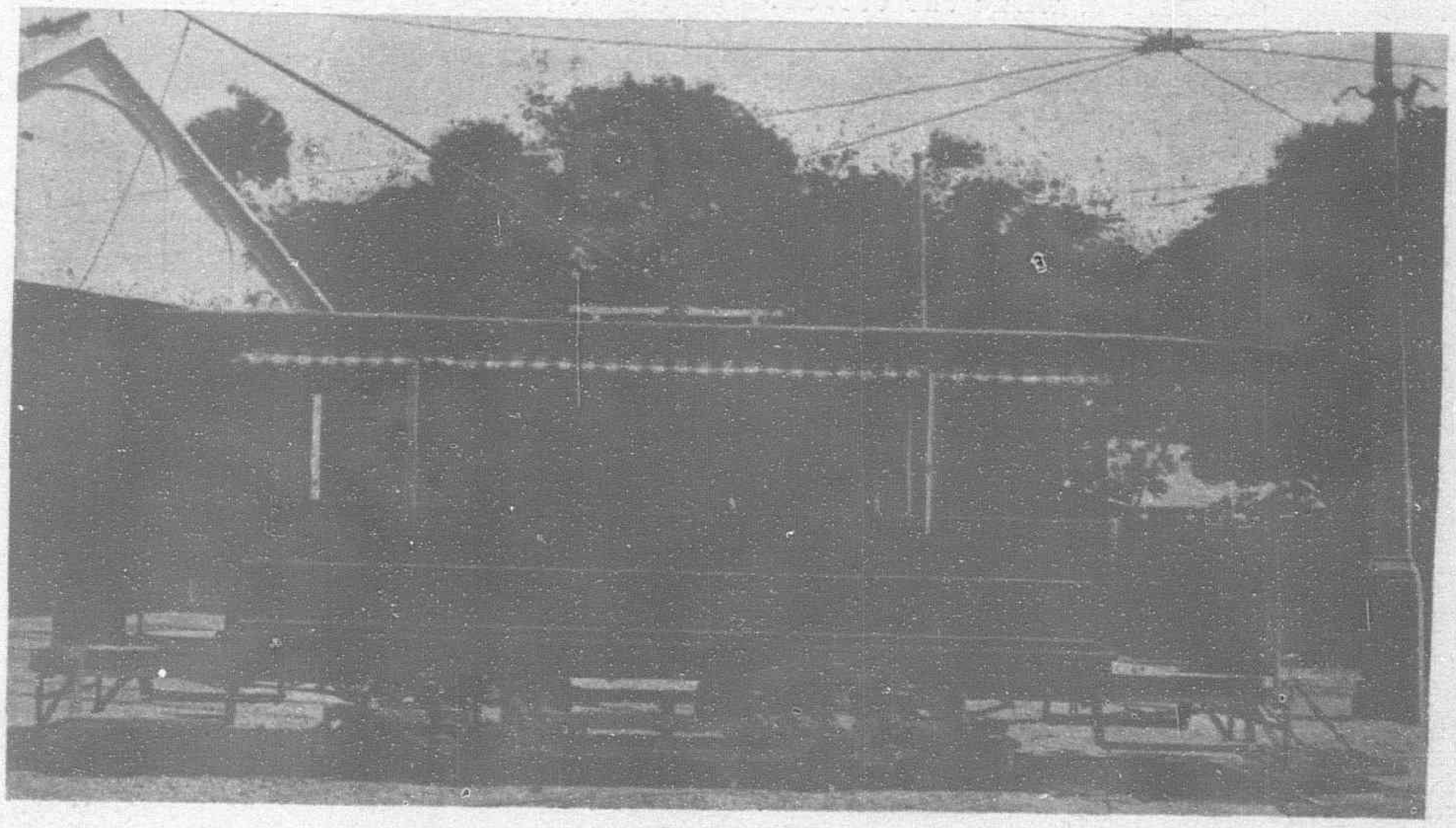


Generating Room of the Siam Electricity Company's Powerhouse at Bangkok, Siam. In foreground are two Lungstrom (STAL) turbo-generating sets each 2,800 k.w. with two A.E.G. turbo-generating sets of 1,200 k.w. each in rear. In the background is reciprocating steam set of 750 k.w.

Bangkok's Tramways and Lighting

The Siam Electricity Company, Ltd.

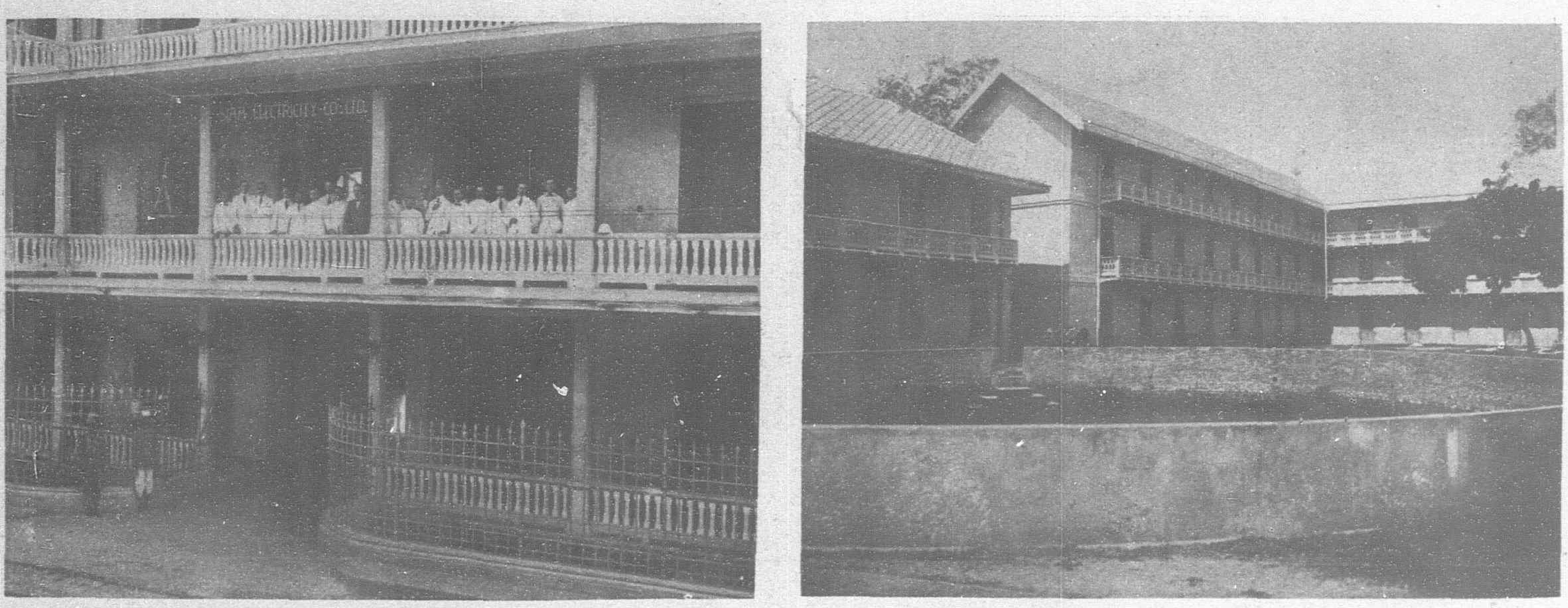
ONE of the most promising power developments in the Far East is found in Bangkok, the capital of Siam, where the Siam Electricity Company, Ltd., holds a virtual monopoly for furnishing light and power to the city and its suburbs. The history of this development goes back to May 1887, when a concession was granted by the Siamese government to Messrs. John Loftus and A. du Plesis de Richelieu to operate a horse-drawn tramway from Bangkolem (the southern-most point of the town) to the royal palace. The concession was transferred to an English company (the Bangkok Tramways Company, Ltd.) which worked it for some years with but poor results. This company went into liquidation, and on May 23, 1892 transferred the concession to a Danish company.



Type of Car operated in Bangkok by the Siam Tramway Company

This company electrified the line (which work was completed in May 1894, at a time when most cities in Europe were without electric tramways) and operated it for some years until in November 1900 the concern was taken over by the Electricity Co., Ltd.

Independently of these developments Messrs. L. de Richelieu and Aage Westenholz obtained in July 1900 another concession to construct and operate a tramway (the Samsen Tramway) which connected the northern part of Bangkok with the centre of the town and this concession was also transferred to the Siam Electricity



Offices and Storehouse of the Siam Electricity Company at Bangkok

Co., Ltd., and traffic was commenced on this line in September 1901.

Electric lighting was first started in Bangkok by a Siamese nobleman in 1890 and was taken over by the government in 1893. It was transferred to an American company, the Bangkok Electric Light Syndicate, in 1897 and this company obtained a contract for lighting of public roads and government premises which contract after certain alterations was taken over by The Siam Electricity Co., Ltd., upon its formation.

The Siam Electricity Co., Ltd.—This company was formed and incorporated in Copenhagen on December 27, 1898 for the purpose of acquiring the concessions, contracts and rights of the former companies and started its existence with a registered capital of £33,400 and with Mr. Westenholz as its manager.

In the course of 1900 and 1901 the fusion was completed whereby all the electric tramway and light undertakings in Bangkok were combined under the S. E. C.

One of the first undertakings of the new company was the removal of the machinery of the two old tramway stations to the electric light station situated in the temple premises of Vat Lieb which latter station the company had acquired by virtue of its concession and where the company's activities are still carried on.

In the course of time the prosperity of the company grew and in 1907 it acquired a controlling interest in the Siamese Tramway Co., Ltd., a company started under royal charter in 1904 by Siamese princes and noblemen to operate another system of tramways in Bangkok.

The Siamese Tramway Co.'s power station was demolished and its management taken over by the S. E. C. and while the two companies each maintain their independent character, the shareholders and board of directors are to a great extent the same and the management is common for both companies, while the current is supplied from the power station of the S. E. C.

The company's offices growing too small a new three storey ferro-concrete office building was erected and the company was honoured by having these premies formally opened by his majesty the king of Siam on September 1, 1916.

The Siam Electricity Co., Ltd., is incorporated under Danish law with a capital of £700,000 fully paid. Its chairman since 1902, is the founder, Mr. A. Westenholz, with Comdr. W. L. Grut as vice-chairman and managing director.

While at the beginning of its existence the company received its main profit from the tramways the position is now reversed. Apart from the light supply and the tramways the company's profit to an increasing extent is accruing from electric installation, sales of stores, contracts, workshop, garage, etc.

The power plant is equipped with two A.E.G.—Curtis turbo-alternating sets of 1,200 k.w. each and two Stal (Lungstrom) turbo-sets of 2,000 and 2,800 k.w. capacity. Two of these sets operate as single phase, 100 cycles with 2,000 volts transformed to 100 for lighting and the other two sets are three-phase, 50 cycles delivering 3,500 volts and 110 for service. In conjunction with the lighting plant, there is a separate installation for supplying the tramways with 550 volts direct current consisting of one 750 k.w. reciprocating steam generator set, one 700 k.w. and one 800 k.w. motor-generator. Steam is generated in ten Babcock and Wilcox boilers of 2,852 sq. ft. of heating surface each at 160-lbs. pressure superheated to 300 degrees.

The tramways operated and owned by the Siam Electricity Company are twenty kilometres in length, of metre gauge. There are 51 motor units, of which two are freight cars, and 20 trailers. The car miles for the year 1921 was 1,893,106.

One of the features of the boiler plant is the use of paddy or rice husks as fuel, of which there is always a plentiful and cheap supply from the numerous river-side rice mills in Bangkok. This fuel is delivered in barges alongside the power house and fed into storage bins by a system of conveyors driven by electricity on the principle of an Archimedian screw revolving in a steel casing. The method of feeding the boilers from the husk bunkers is by an arrangement of mechanically controlled shutters which regulates the feed according to the requirements.

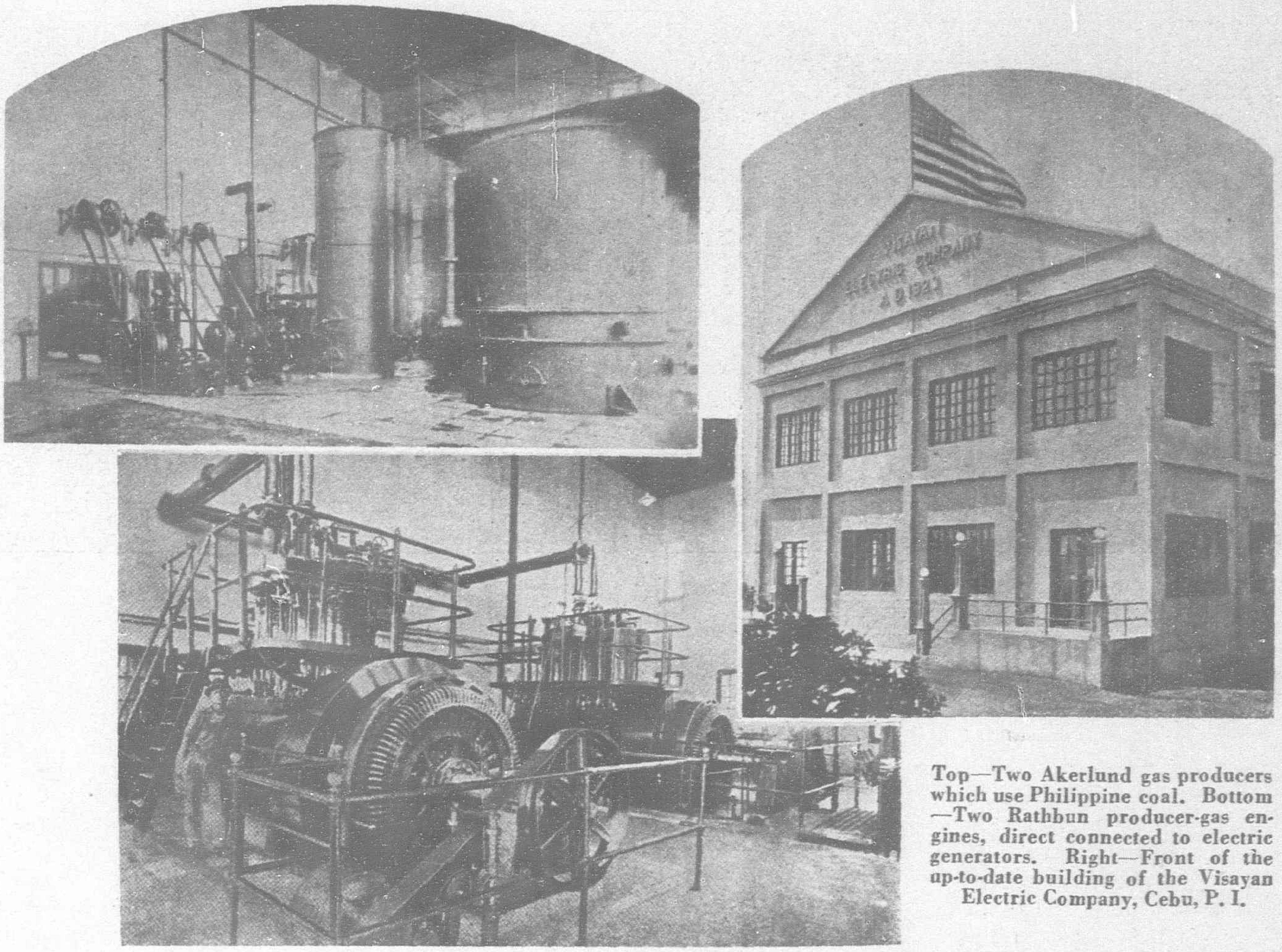
As noted above the Siam Electricity Company also controls the Siamese Tramway Company, Ltd., established in 1904 with a capital of Ticals 725,000 (about £75,000). This company operates ten miles of single track line, with 33 motor units and purchases its power from the plant of its affiliated company. The number of car-miles run for both companies in 1922 was over three million. In addition the company has a large and well equipped repair and machine shop with iron and brass foundry attached ; a garage with agencies for manufactures of several well-known cars and accessories ; and an import and sales departments, with stores and showrooms which mainly works in the electrical and allied fields.

The total number of employees comprises 20 Europeans and about 1,100 Asiatics, the majority being Siamese.

Important New Zealand Contract

In connection with the extensions which are now taking place at the Lake Coleridge hydro electric power-station of the New Zealand government, it is interesting to note that Messrs. Bruce Peebles & Co., Ltd., Edinburgh, have been successful in securing the contract for the supply of the two 7,500 k.w. alternators, each complete with direct coupled exciter.

The alternators will be designed to operate at .85 power factor and to generate a three-phase 50-cycle current at a pressure of 6,600/7,000 volts when driven at a normal speed of 500 R.P.M. They will be of the totally enclosed forced ventilated type, the cooling air being provided by an induction motor-driven fan which is also to be supplied by the firm. There will be two main bearings of the forced lubricated type, the oil pump being driven by belt from the main shaft. The alternators will be designed to withstand a runaway speed of 90 per cent. above normal. The contract includes for the supply of oil tanks and strainers, oil coolers with water tanks and all apparatus necessary for the successful operation of the plant.



Top—Two Akerlund gas producers which use Philippine coal. Bottom—Two Rathbun producer-gas engines, direct connected to electric generators. Right—Front of the up-to-date building of the Visayan Electric Company, Cebu, P. I.

Gas Producer Power Plant in the Philippines

A LITTLE over a year ago a 500-h.p. gas producer plant started active operations at Cebu in the Philippine Islands, and the performance of this installation has been so satisfactory in the meanwhile that we feel justified in referring to it, says *The Compressed Air Magazine.* The plant in question is the property of the Visayan Electric Company; and the initial problem involved was to obtain prime movers which could be operated most economically with the fuel obtainable from local sources—in other words, equipment that could utilize to advantage Philippine coal. In passing, let it be pointed out that the native coal is not of a high grade.

On the face of it, it was plain that the coal would not prove efficient if burned under a boiler; but its chemical composition gave ample warrant for the belief that it could give satisfactory and far better results if used in conjunction with gas producers for the driving of gas engines. Having settled this point, the engineers were then called upon to choose producers and gas engines which would get the most out of the available fuel. After a survey of the market, they decided to purchase two No. 30, Type "B," Akerlund gas producers and two 250-h.p. Rathbun gas engines—each of the latter to be direct connected to a 175-kilowatt generator. The electric current generated is for town lighting and for service in various small industries.

Akerlund gas producers are designed to work upon the down-draft principle and, therefore, function differently from up-draft gas producers which employ mechanical scrubbers to clean the gas before it is delivered to the gas engines. The type "B" gas producer is the outcome of wide experience, relatively simple in its get-up, and is capable of generating from low-grade coals a maximum of clean gas of uniform quality such as is required for the best work in a gas engine. The Rathbun gas engine is, likewise, the outcome of much experience and engineering skill; and the combination adopted for the Cebu central station has rendered excellent service.

The plant began to deliver current to the company's lines in September of 1923, and has been running well ever since. Philippine coal, mined from near by, has been found to be the cheapest domestic fuel and considerably more desirable as a gas producer than either Japanese or Australian coals—both of which have been tested.

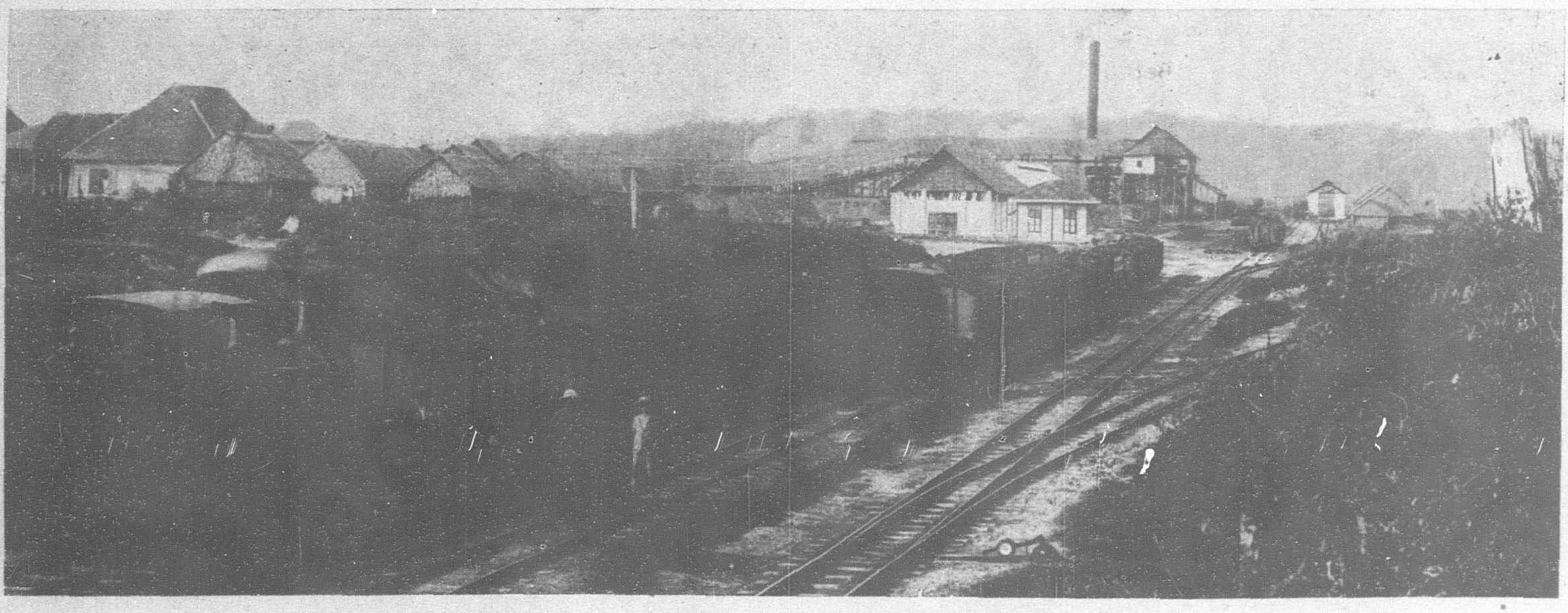
What has been done by the engineers of the Visayan Electric Company is striking evidence of how modern power plants can be adapted to utilize effectively and efficiently local fuels which, at first blush, are far from promising sources of motive energy.

A New League of Nations

Ten countries are contributing to the modernization of the Java state railways, which is equipping with modern cars and trailers for suburban passenger service a section that includes the cities of Batavia and Meester Cornelis. The United States, India, Holland, France, Belgium, Cuba, Switzerland, Canada, Germany and England are furnishing material for the work.

The United States is contributing the major part of the electrical equipment, the rubberoid for the roofs, the devices for coupling in emergency to the existing steam trains, the vestibule buffers, the pneumatic door opening mechanisms, and the car seats.

The General Electric Company of America is electrically equipping ten of the cars. India is furnishing the teak wood for the roofs. France is contributing the wood for the floors. The all-steel bodies are being built in Holland. The window glass, wheels and axles are from Belgium, and the mahogany for interior trim from Cuba. Switzerland is supplying the wiring devices, and Canada the asbestos linings. The truck springs are from Germany, and the air brakes from England.



Private Railway Siding of the Malayan Collieries, Ltd., at Batu Arang, F.M.S.

Malayan Collieries Ltd.

Notes on Batu Arang Colliery

Paper Read Before the Engineering Association of Malaya

By James Barr, B.E., M.I.M.M. (Aust.), M. Am. I.M.M.E.

THE property, consisting of 8,660 acres held under mining lease, is situated in the Mukim of Rawang, district of Ulu Selangor, and the mine itself is distant three-quarters of a mile from the Kuang-Batang Berjuntai government railway, to which it is connected by a private siding, the traffic over which is carried out by the company's locomotives.

It is not certain that coal exists under the whole of the leases, but known reserves amount to approximately thirty million tons. Three seams probably exist, but only two are being worked.

All coal despatched is weighed by the F.M.S. railways on their weighbridge, situated near the colliery screens. The average output at the present time is 24,000 tons per month. This can be trebled, should the demand for coal ever warrant the increase. The output comes in about equal proportions from the underground workings and the open casts.

The coal might be called an advanced lignite. It is pitch black in color, hard when freshly mined, and breaks with a conchoidal fracture. The specific gravity varies from 1.2 to 1.3, and the calorific value of the screened coal is 11,000 B.T.U. The output is marketed in three sizes: screened, unscreened, and smalls.

The coal comes from the mine in tubs, holding 12 cwts., and these pass through a head Wrightson rotary tippler, and discharge on to a bar screen 16-ft. long by 6-ft. wide, with bars spaced 1¼ inches apart. The screened product falls directly into railway wagons, and the smalls into a hopper, from which they are easily transferred to the wagons below.

Working Plant

The working plant falls naturally under the two headings of surface, and underground. As machine mining is not necessary, and therefore not practised, the underground plant is limited in character, and consists of pumping machinery, and haulage machinery only.

The Malayan Collieries and the Village of Batu Arang, F.M.S. Nine Years Ago this was Virgen Jungle

The surface equipment is rather more elaborate, and includes the following :—

Boiler House.—Containing four Babcock and Wilcox horizontal type water tube boilers, two of 2,531 sq. feet heating surface, and two of 2,010 sq. feet. Each fitted with mechanical chain grate stoking plant, and working at a pressure of 160-lbs. per sq. inch. An induced draught fan was originally installed, but it was found unnecessary, and was dismantled.

Two main boiler feed pumps of the turbine type, electrically driven, and two steam-driven Worthington pumps kept as standby. Feed water tank of brick, capacity 30,000 gallons. Steel chimney stack, on a brick foundation. It is 9-ft. 3-in. diameter, by 130-ft. high.

Power House.—Power house of brick, containing three 300 k.w. sets, by Mather & Platt, 500 volts, direct current, compound wound dynamos, with commutating poles. These are direct driven by Browett and Lindley high-speed compound engines. The switchboard is by Erskine Heap & Co. Lighting is provided for by a 16 k.w. motor generator, 500 to 100 volts.

All motors are compound wound, with commutating poles, and are fitted with Brock-Hirst special type of mining starters, with overload and no volt releases.

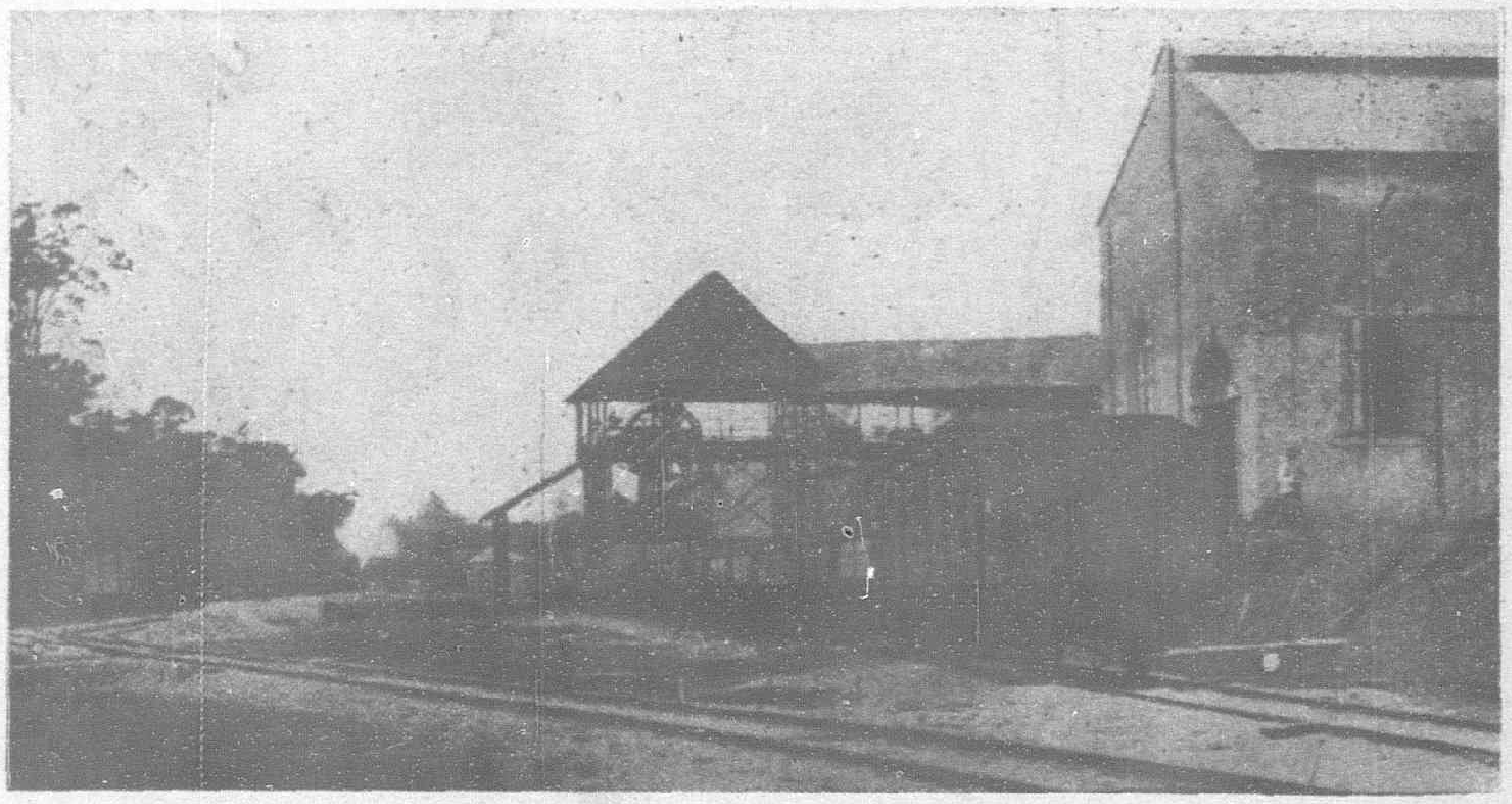
All cables carrying main current to the mines, workshops, etc., are special tropical, twin core, paper insulated lead covered, and are laid below ground in bitumen in stoneware troughing. The cables in the mine itself are of similar type, but are armored with steel wire, and suspended from timbers.

Workshops.—Of brick, with galvanized iron roofing. They are equipped with the following :—

One 14-in. centre, lathe.
One 10 inch centre, lathe.
One punching and shearing machine.
One planing machine.
One radial drilling machine.
One screwing machine.
Grinders.
Blacksmithing outfits.

Ventilating-fans.—The main fan is a "Sirocco," 98 inches diameter, capable of passing 200,000 cubic feet of air per minute against a 4-inch water gauge. It is rope driven by a 200 b.h.p. motor. The smaller fan, which is kept as a standby, is of the "Turbon" type, 36 inches in diameter, capable of delivering 20,000 feet of air per minute, and is direct driven by a 25 h.p. motor.

Hydraulic Stowage Pumps.—As adjuncts to the underground stowage plant there are on the surface two centrifugal pumps, 8 inch delivery, 1,100 gallons per minute ; direct driven by Mather and Platt motors.



Malayan Collieries at Batu Avang, F.M.S.

Railway Sidings.—Apart from the siding connecting with the government railway, there are in use 3½ miles of colliery sidings, and this length will soon be considerably extended.

Brickmaking Plant.—Plastic type, capable of turning out 1,000 bricks per hour.

Stores Buildings.—These are of brick, and are 105-ft. by 60-ft., and 105-ft. by 30-ft., respectively.

Open Casts.—The open casts are equipped with portable boilers, small haulage winches, and side tipping trucks. This is anything but an ideal arrangement, but it has to be remembered that opencasting was started at a time when people were fortunate in being able to get any kind of plant, good, bad, or indifferent. The existing equipment has always been looked upon as a stop gap. It has served its purpose, and will shortly be replaced by something more efficient.

Bungalows.—Eleven bungalows, of comfortable design, accommodate the staff ; and a small club house and tennis court are also provided.

Underground

Approximate sections of the two seams being worked are as follows :—

TOP SEAM.

Roof	Shale.
Coal	17-ft. 0-in.
Clay parting	9-in.
Coal	7-ft. 0-in.
Carbonaceous shale	6-ft. 0-in.
Coal	7-ft. 0-in.
Clay parting	2-in.
Coal	9-ft. 0-in.

BOTTOM SEAM.

Roof	Shale.
Coal	25-ft. 0-in.

Both outcrop at the surface, and dip at an angle of 14 deg. They have been attacked by inclined galleries, variously known as slopes, tunnels, inclined shafts, etc. Rails are laid in these slopes, and the coal is hauled through them in tubs by means of haulage winches, geared 3 to 1, with cylinders 12 inches in diameter, by 18 inches stroke.

Mining Methods.—Until two years ago the system of working employed was that of ordinary bord and pillar.

In the bord and pillar system of mining the area to be worked is divided into small districts, or blocks, by main entries or levels, and cross entries, or headings. The coal in each block is mined by turning off from the headings at stated intervals a number of bords, or rooms. The blocks of coal left between the bords, or rooms, are known as pillars. In ordinary practice these pillars are recovered, usually soon after the bords have been driven in a certain distance, but in special circumstances only after the bords have reached the boundary of the property. The thickness of the pillars to be left in the first working is determined by several factors, such as the nature of the roof, the thickness of the overhead cover, the thickness and nature of the coal seam. Generally speaking, the greater the cover, and the thicker the seam, the greater must be the width of the pillar. At Batu Arang, the seam being very thick, extra large pillars had to be left ; but when the time came for their removal a most disconcerting factor obtruded itself. This was the liability of the coal to spontaneous combustion. It is obvious that when pillars are extracted, the roof being left unsupported must fall, and at this colliery nearly every fall of roof was accompanied by an outbreak of fire. The situation was rather a difficult one. Either the pillars had to be left intact, and 70 per cent. of the coal left behind, or they were to be taken out at the risk of serious fires, which in turn meant either partial dislocation or entire stoppage of output.

Both positions were untenable, and a way out had to be found. This was discovered in hydraulic stowage, which, in other words, means the replacement of coal extracted by sand sluiced into the depleted workings.

The natural concomitant of hydraulic stowage is the longwall system of working and to-day our method is longwall and hydraulic stowage. For the time being attention is concentrated on winning the coal left in the pillars of the old workings, and practically the whole of it is being recovered. In the longwall system as usually practised all the coal is extracted, and the roof allowed to fall or cave over a partially or wholly packed goaf, haulage roads being maintained through the caved area by means of packs built along their sides. In general, longwall is not usually applicable to thick seams, but here, through having command of large quantities of sand, we can apply longwall to a thick seam, for we are able to thoroughly fill the goaf, or empty spaces; and so control the roof settlement that the danger of fires is very considerably lessened, if not altogether eliminated. Hydraulic stowage has certainly enabled us to obtain a high percentage of extraction, and thereby prevented wastage of a national asset, but it is an expensive process, as will be evident when it is remembered that the sand has to be mined, transported from a distance, sluiced underground, and the excess water pumped to the surface.

The following brief description of the round of operations will help to convey some idea of how the system works:—

The sand is mined by an ordinary gravel pumping plant at Kundang, and transported by rail to the colliery. Arrived there, the wagons are run over the top of, and are emptied direct into, sand bunkers. These sand bunkers are rectangular, brick lined excavations, divided into two parts by a curved retaining wall. One part is the sand bunker proper, and the other the receiving and mixing chamber. The bunker has a sloping bottom, about 1 in 4, down which the sand is flushed through narrow vertical openings in the retaining walls into the receiving and mixing chamber. This chamber is built over a shaft, down which is carried the pipe which conveys the mixed sand and water into the underground workings. In the mixing chamber water is added, to give the sand the required consistency. Depending upon the distance the mixture has to be carried the consistency varies from one of sand to six of water, up to one of sand to ten of water. Normally 1,000 yards of sand can be conveyed from the bunkers and stowed in the workings in eight hours. The stowage pipes are 5 inches in diameter, and the wear and tear on them is surprisingly small. The bends naturally suffer most in this respect, and they are of special design. All pipes are turned periodically, to distribute the wear.

The place to be filled with sand is barricaded off by means of props between the roof and floor. Stretched round these props from top to bottom are strips of cheap Hessian cloth. This cloth has sufficient strength to keep back the sand, but its loosely woven structure allows the water to escape quite freely. The escaping water is made to travel as long a distance as possible before arriving at the pump sump. Interposed in its course are several silt, or settling pits, so arranged that one-half can remain in service while the other half is being cleaned out. Arrived at the main sump the now comparatively clean water is pumped to the surface by means of two eight inch, direct driven, centrifugal pumps, by Mather and Platt; each capable of delivering 1,100 gallons per minute, against a head of 500 feet.

Handling the Product.—The coal, after being broken down, is filled into tubs which are brought along the face. The filled tubs are pushed out to haulage ways, or "jig planes" and jigged down to the level. These jig planes are simply self-acting inclines, operated by a pulley fixed to a prop. at the head of the jig, the descending full tub raising the empty one.

Arrived at the level, the loaded tubs are drawn by storage battery locomotive to the main "Flat," or assembling sidings, whence they are raised to the surface in rakes of eleven at a time, up the slope, or engine plane, already mentioned.

New Motor Ships for the O.S.K.

(Continued from page 24.)

These auxiliary engines are of the airless-injection Diesel type recently developed by Sulzers, operating on the two-cycle principle and being very simple in design owing to the complete absence of mechanically operated valves. Ample provision is to be made in the engine-room for a supply of manœuvring air, and there will be two auxiliary manœuvring compressors, each driven by a 140-h.p. electric motor. The machinery for two of the ships will be built by Sulzers in Switzerland, but that for the third vessel will be constructed at the Mitsubishi Dockyard under licence. When completed these ships will be placed on the Japanese-South American run.

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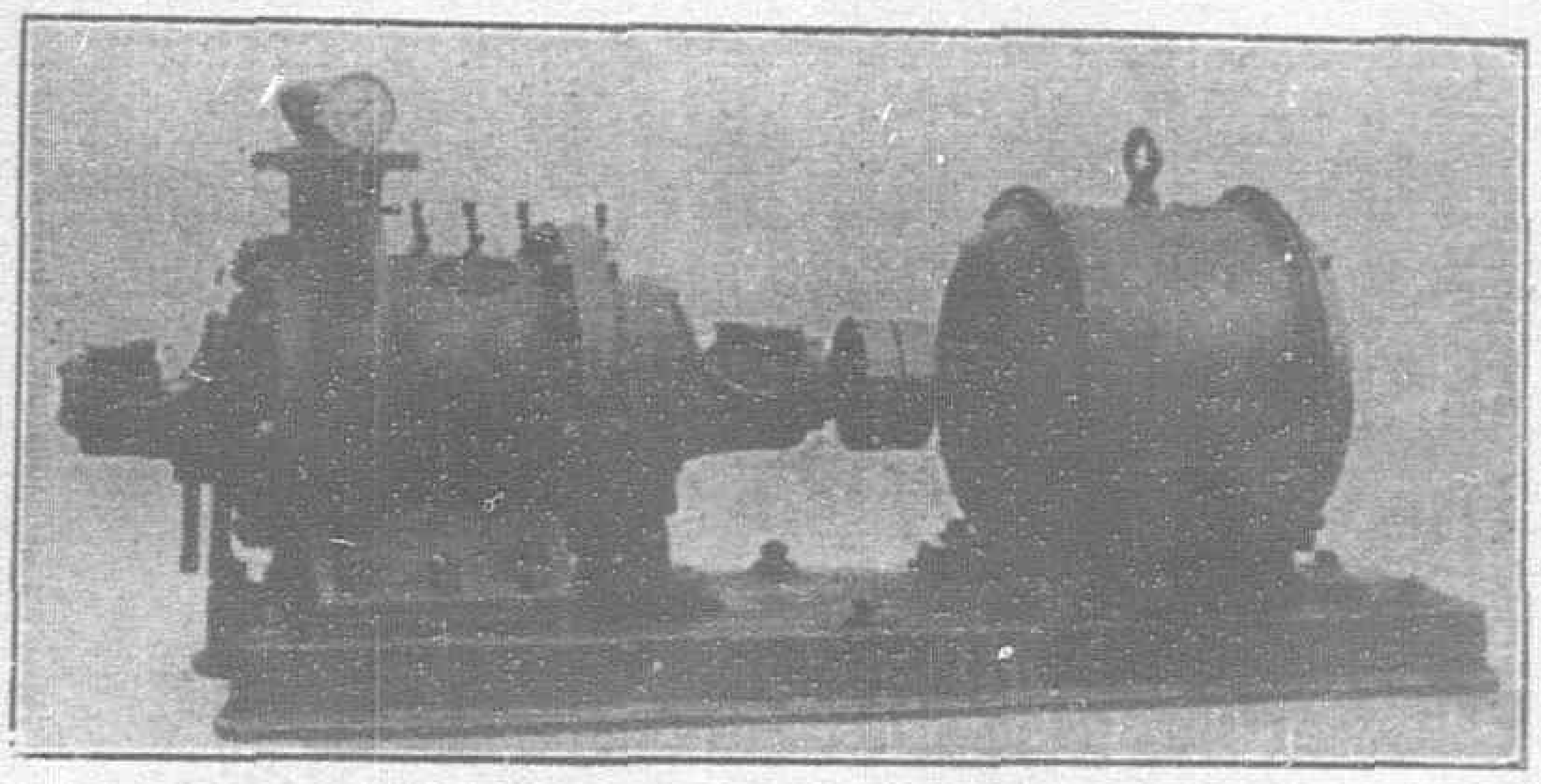

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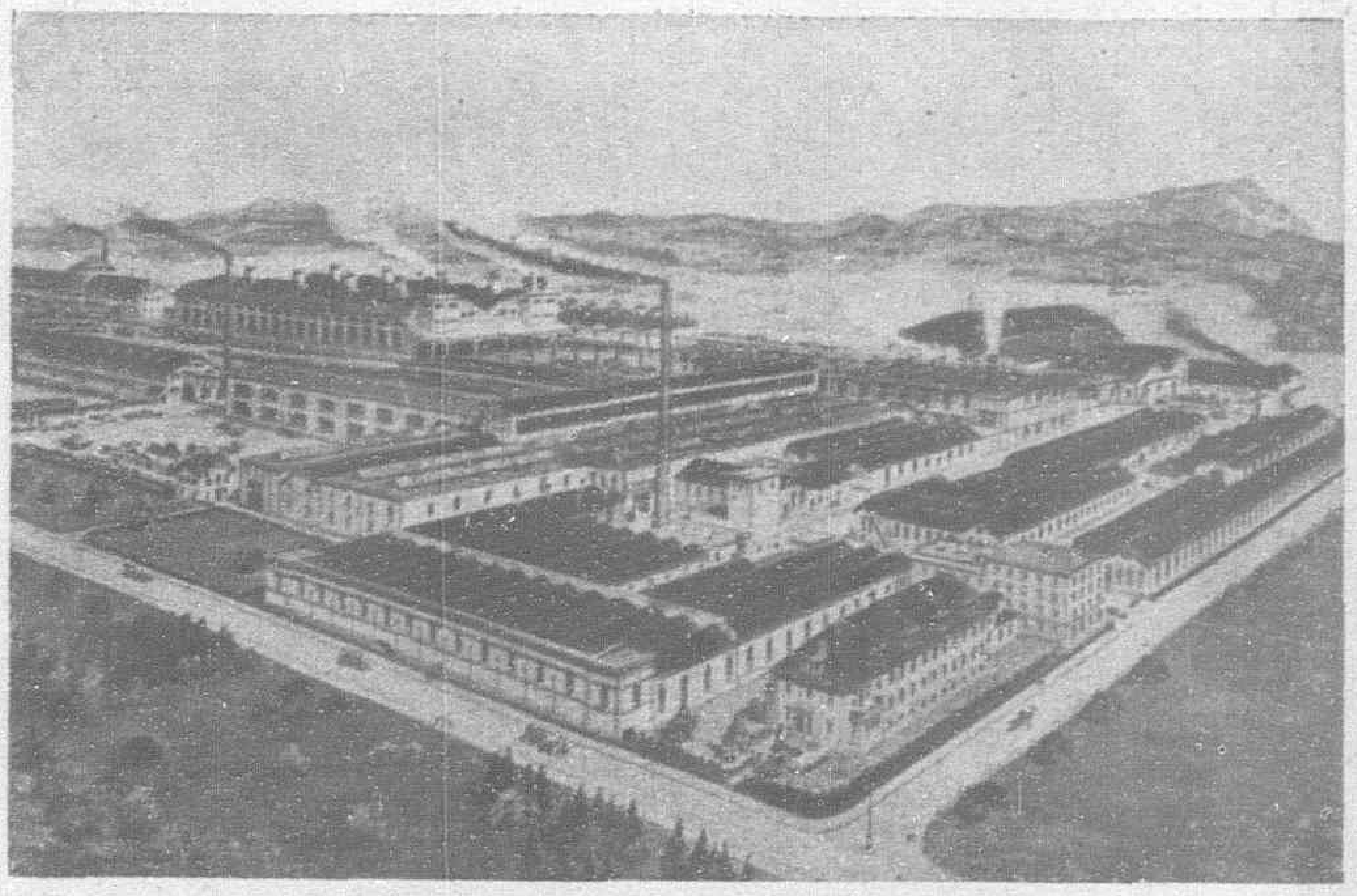

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